

URBAN WATER MANAGEMENT PLAN

DECEMBER 2005

Planning Department



Contra Costa
Water District

CONTRA COSTA WATER DISTRICT

URBAN WATER MANAGEMENT PLAN

December 2005

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Executive Summary

The 2005 Urban Water Management Plan (UWMP) for the Contra Costa Water District (CCWD or District) is an update to the plan adopted by the District's Board of Directors in December 2000 and is prepared in compliance with the California Urban Water Management Planning Act. All urban water suppliers, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet annually are required to prepare an UWMP. An UWMP is required in order for a water supplier to be eligible for Department of Water Resources (DWR) administered State grants and loans and drought assistance.

The UWMP documents the District's planning activities to ensure adequate water supplies to meet existing and future demands for water. This five-year update of the UWMP incorporates the recommendations of the District's Future Water Supply Study, which was completed in 1996 and updated in 2002. The UWMP presents forecasted supplies and demands, describes the District's conservation programs, and identifies recycled water opportunities to the year 2030. The UWMP also includes a water shortage contingency analysis and a description of the plan adoption, public coordination, and planning coordination activities. The CCWD UWMP meets all requirements of the State's Urban Water Management Planning Act.

Water Quality

CCWD's mission is to "strategically provide a supply of high-quality water at the lowest cost possible, in an environmentally responsible manner." CCWD obtains its water supply exclusively from the Sacramento-San Joaquin Delta (Delta) and serves treated and raw (untreated) water to approximately 510,000 people in central and eastern Contra Costa County. All of CCWD's intakes are subject to variations in water quality caused by salinity intrusion, Delta hydrodynamics, and discharges into the Delta and its tributary streams from both point and non-point sources. Since 1992, CCWD has spent over \$850 million on capital improvements, including \$450 million on the Los Vaqueros Project, as well as over \$200 million on projects directly related to improving water quality and the security of CCWD's water delivery system (such as improvements at both Bollman and Randall-Bold Water Treatment Plants, construction of the Multi-Purpose Pipeline, improvements at Contra Loma Reservoir, and other CCWD projects). Notwithstanding these efforts, Delta water quality at CCWD's intakes declines at times, affecting the reliability of CCWD's supplies and its ability to consistently provide high-quality water to its customers. A detailed discussion of the reliability of the District's supplies and water quality is included in Section 2.

CCWD is implementing a comprehensive water quality strategy to protect and improve source and treated water quality for its customers. CCWD's multi-pronged approach includes seeking improved water quality sources, reducing impacts of Delta agricultural drainage on source water quality, participating in collaborative research on advanced water treatment of Delta water, and supporting regulatory and legislative initiatives for improving drinking water quality and source water protection.

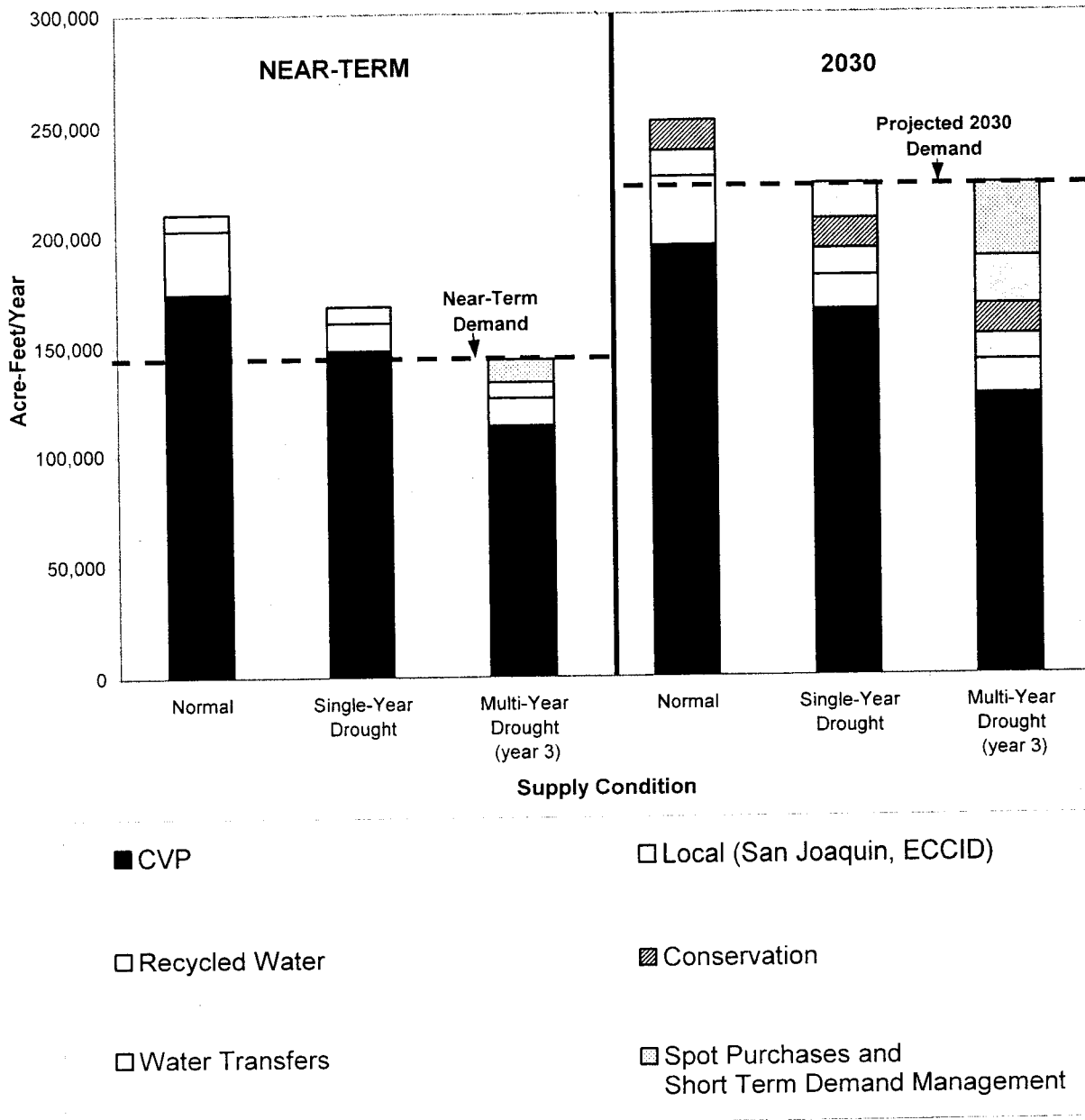
Forecast of Supply Reliability and Demand

The FWSS included an evaluation of water demand, conservation, and existing and potential sources of supplies including continued use of CVP water, groundwater, recycled water, desalination, and water transfers. The supply and demand forecasts presented in the UWMP are consistent with the FWSS and are shown in Figure E-1. Near-term demands can be met under all supply conditions except in the latter years of a multi-year drought where short-term water purchases in conjunction with a request for up to 7 percent voluntary short-term conservation would be considered to meet demands. Near-term demands have been reduced by approximately 3,000 acre-feet annually through implementation of the District's conservation program.

Future demands will be met through implementation of the FWSS. The Preferred Alternative identified in the FWSS included renewal of CCWD's water service contract for CVP water, which has been completed; implementation of an expanded conservation program (referred to as CPA1), which is ongoing; and water transfers to bridge the gap between projected demand and supplies. A February 2000 Agreement with the East Contra Costa Irrigation District (ECCID) to transfer surplus irrigation water was the first long-term water transfer for CCWD. Currently up to 9,700 acre-feet per year (5,700 acre-feet in normal years and 9,700 acre-feet in CVP shortage years) is available under the agreement. In the future this agreement will provide up to 12,200 acre-feet per year (8,200 acre-feet in normal years and 12,200 acre-feet in CVP shortage years).

In later years, several types of drought conditions may result in supply shortfalls between 16,000 and 50,000 acre-feet. The water supply reliability goal adopted by the District's Board of Directors is to meet 100 percent of demand in normal years and a minimum of 85 percent of demand during a drought. Planned implementation of the FWSS preferred alternative will provide a minimum of 22,000 acre-feet of additional supply through water transfer agreements. A combination of short-term water purchases and drought demand management are planned to meet any remaining supply deficit.

FIGURE E-1. PROJECTED SUPPLY AND DEMAND



Water Demand Management Measures

The UWMP describes the District's current water demand management measures. Conservation will reduce the need for future supplies. CPA 1 expanded the District's conservation efforts to encompass wholesale and retail customers, and it is projected to reduce demand by approximately 8,000 acre-feet in the year 2040. (This savings is for "hard" conservation and is the minimum anticipated savings). This is in addition to expected non-District conservation savings, projected to occur as a result of State and Federal regulations and the normal replacement of fixtures and devices with more water efficient models. CPA 1 is consistent with

the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) developed by the California Urban Water Conservation Council and signed by CCWD in 1991.

CCWD began expansion of its basic water conservation program in the summer of 1988 with a pilot residential water audit project. The conservation program currently is comprised of 14 individual elements, including those implemented under the MOU. A detailed discussion of current water conservation activities and their status is provided in Section 8. Table E-1 below lists the activities completed and the current annual and cumulative savings achieved.

TABLE E-1. WATER CONSERVATION PROGRAMS			
	Total	Annual Savings (AF in FY06)	Cumulative Savings from FY06 and Past Programs (AF)
SF Surveys	11,640	218	3,130
MF Surveys	29,457	249	2,708
CII Surveys	1,723	459	4,319
Landscape Surveys	1,441	391	4,481
SF Showerheads	14,918	59	803
MF Showerheads	8,929	27	253
Residential ULFTs	33,856	997	6,964
CII ULFTs	1,532	53	149
SF Washers	7,530	166	470
CII Washers	283	23	53
Pre-Rinse Nozzles	582	102	202
CII Low Flow Urinals	115	2	9
CII Low Flow Faucets	128	1	4
'Smart' Sprinkler Timers	40	19	45
Standard Sprinkler Timers	81	13	117
Drip Retrofit (stations)	80	4	17
Rain Sensors	80	2	20
Sprinklers Replaced	2,903	2	7
Total		2,787	23,751

CCWD has successfully developed, implemented, and maintained an effective water conservation program since 1988. Current water use levels within CCWD are below pre-drought (mid 80's) levels, despite an increase in service area population of 37% since 1985.

CCWD was the recipient of the U.S. Bureau of Reclamation (USBR) 2003 Commissioner's Water Conservation Award for the Mid-Pacific Region. The award is given to entities that have demonstrated significant accomplishments in improving water use efficiency. CCWD was recognized by USBR for its progressive and successful water conservation program including one of the most accurate, large-scale water budget programs in the State of California.

Water Shortage Analysis

The water shortage analysis component of the UWMP provides options for managing the water supply and demand balance throughout the District during water supply shortage conditions. These options have been developed based on CCWD's previous experience with short-term demand management and consideration of customer long-term conservation. This updated Water Shortage Contingency Plan sets forth demand reduction goals in four stages linked to the availability of supplies to the District. The total demand reduction goal for each stage increases from less than 10 percent up to 50 percent of normal demand from Stage I to Stage IV. Stages I and II involve voluntary customer demand reduction measures and Stages III and IV impose mandatory measures including allotments and overuse charges.

TABLE E-2. DEMAND REDUCTION STAGES AND GOALS			
Stage	Supply Shortage Stage	Description	Total Available Supply
I	Up to 10%	Voluntary Conservation	90%
II	10 - 20%	Water Alert	80-90%
III	20 - 35%	Water Emergency	65-80%
IV	30 - 50%	Water Crisis	Public Health & Safety

Recycled Water Opportunities

In response to an amendment to the Planning Act in 1991, the UWMP provides current use of recycled water in the District, a description of the potential recycled water sources and projects, and the projected use of recycled water within the District's service area over the next 20 years.

Water recycling is a component of CCWD's long-term sustainable water supply strategy and CCWD cooperates with local wastewater agencies that wish to provide recycled water for appropriate purposes. CCWD completed a number of studies, demonstration projects, pilot testing programs and business plans between 1988 and 1993 to verify the feasibility of using recycled water. In 1995, Central Contra Costa Sanitary District (CCCSD) and CCWD entered an agreement where CCCSD purveys recycled water to areas in Concord and Pleasant Hill. Sixty-one customers were identified in the agreement as potential recycled water users with a total potential recycled water demand of approximately 1,600 af/yr. The Delta Diablo Sanitation District (DDSD) and CCWD entered an agreement for DDSD to purvey up to 8,600 af/yr of tertiary treated recycled water to the Delta Energy Center and the Los Medanos Energy. Both energy centers were operational by 2002. This project is the largest industrial recycled water project in the State of California. In 2004, DDSD and CCWD entered another agreement where development of recycled water facilities will provide up to 1,650 af/yr to areas in Pittsburg and Antioch. The recycled water would be for urban landscape and golf course irrigation uses.

Approximately 9,000 acre-feet of recycled water was delivered within the District's service area in 2005. Existing agreements provide for the delivery of up to approximately 13,000 acre-feet per year in the future. Actual and projected use of recycled water is shown in Table E-3.

TABLE E-3. ACTUAL AND PROJECTED FUTURE USE OF RECYCLED WATER

Recycled Use	2005 actual (af/yr)	2010 (af/yr)	2015 (af/yr)	2020 (af/yr)	2025 (af/yr)	2030 (af/yr)
Landscape	700	Up to 3,360 ^(a)	3,360 ^(a)	3,360 ^(a)	3,360 ^(a)	3,360 ^(a)
Industrial ^(b)	7,920	Up to 9,720	Up to 9,720	Up to 9,720	Up to 9,720	Up to 9,720
Total	8,620	Up to 13,080	Up to 13,080	Up to 13,080	Up to 13,080	Up to 13,080

(a) CCCSD's Pleasant Hill Project (1,630 af), DDSD's LMEC/DEC project (80 af) and DDSD/CCWD General Agreement (1,650 af).

(b) DDSD's 12.8 mgd water recycling plant provides recycled water to the DEC/LMEC power projects. The power plants will use up to 8,600 af/yr. CCCSD's industrial use includes 1,120 af/yr of plant use.

CCWD will continue to work with local wastewater agencies to implement recycled water projects that are financially viable, provide beneficial use and are consistent with appropriate legal, public health and environmental requirements. The FWSS provides the analysis necessary to determine when different types of recycled water projects may become viable alternatives. Recycled water projects will continue to be examined as potential sources when the FWSS is updated (approximately every five years), or as new technology becomes available.

Report Contents

The UWMP contents and format reflect the guidelines provided by the Department of Water Resources (DWR). The sections are generally organized with the applicable statement of law appearing first, followed by detailed information demonstrating compliance with the law. Section 1 summarizes the District's ongoing public participation activities and interagency coordination efforts related to the UWMP. Section 2 describes CCWD's service area, water supply sources, major facilities, transfer opportunities, and provides information on CCWD's past, current and projected water use. This section also contains a comparison of projected water supply and demand through 2030. Sections 3 and 4 describe CCWD's water demand management measures and water shortage contingency plan. Section 5 summarizes recycled water activities. Sections 6 and 7 describe water quality impacts on reliability and show water supply and demand comparisons. Lastly, section 8 describes the adoption and implementation process of the UWMP.

Some of the information requested by DWR is contained in existing documents, which are included in the report appendices. The documents include relevant sections of the CCWD Code of Regulations and applicable Board Resolutions. Additional appendices to the report have been created to include the California Urban Water Conservation Council (CUWCC) Annual Report prepared by CCWD for FY2003 and FY2004, the public notices prepared for the UWMP, the letters to the municipal customers and service area communities, and a list of references.

SECTION 1: Agency Coordination

10620 (c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in area wide, regional, watershed, or basin wide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621. (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Contra Costa Water District (CCWD) encouraged agency coordination in the development of its water supply plan (FWSS in 1996 and 2002) and the UWMP. During UWMP preparation, notification letters were sent on June 1, 2005 to CCWD's municipal customers as well as to local cities, counties and wastewater agencies describing plan preparation requirements. A second letter was sent on September 1, 2005 to the municipal customers summarizing CCWD's supply

reliability assessment that these customers needed to consider in preparation of their own UWMPs. Copies of the letters sent to municipal customers are provided in Appendix B. CCWD also met and consulted with municipal customers when contacted for assistance. The draft UWMP was distributed to CCWD's municipal customers and to communities, cities, and other agencies within CCWD's treated water service area prior to adoption by the Board of Directors. One comment letter was received from the Ironhouse Sanitary District and is provided in Appendix G along with CCWD's response.

In order to maximize its water resources and minimize its need for additional supplies, CCWD is collaborating with several Bay Area agencies on an Integrated Regional Water Management Plan, is one of four agency partners in the Bay Area Regional Desalination Project, and is implementing a Water Transfer Program.

SECTION 2: Contents of UWMP

Step One. Appropriate Level of Planning for Size of Agency.

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

All elements required by the Urban Water Management Planning Act that are applicable to CCWD have been addressed in this report.

Step Two. Supplier Service Area

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

Service Area Description

CCWD serves approximately 510,000 people throughout north, central, and east Contra Costa County. Its customers also include 10 major industries, 36 smaller industries, and approximately 50 agricultural users. CCWD operates and maintains a complex system of water transmission, treatment, and storage facilities to supply both treated and untreated (raw) water to its customers.

The District's service area encompasses most of central and northeastern Contra Costa County, a total area of more than 137,127 acres (including the Los Vaqueros watershed area of approximately 19,100 acres). Water is provided to a combination of municipal, residential, commercial, industrial, landscape irrigation, and agricultural customers. Major raw water municipal customers include the Golden State Water Company (Bay Point), Diablo Water District (Oakley), and the Cities of Antioch, Pittsburg, and Martinez. Treated water is distributed to individual customers living in the following communities in the Treated Water Service Area: Clayton, Clyde, Concord, Pacheco, Port Costa, and parts of Martinez, Pleasant Hill, and Walnut Creek. In addition, CCWD treats and delivers water to the City of Brentwood, Golden State Water Company (Bay Point), and the City of Antioch.

For the first 25 years of its existence, the District's main responsibility was the purchase and distribution of raw (untreated) water through the Contra Costa Canal. The cities and other water utilities within the District were responsible for treating water used by their customers. However, in the late 1950s, many citizens and public officials became concerned about the quality and cost of the water in the central county area. To solve this problem, the District purchased the California Water Service Company's Concord-area treatment, pumping, storage, and distribution facilities. In 1968, the District replaced the old treatment facilities with the construction of its own Ralph D. Bollman Water Treatment Plant in Concord. The Bollman plant now provides treated water to approximately 230,000 people in the central county area and by contract to Bay Point. In 1992, the District completed the Randall-Bold Water Treatment Plant in Oakley that is jointly owned with the Diablo Water District (DWD). The Randall-Bold plant provides treated water to DWD, and by contract, to the City of Brentwood and the City of Antioch. Additionally, the Multi-Purpose Pipeline, constructed in 2003, allows the District to serve new customers in the Central County Treated Water Service Area (TWSA) from the Randall-Bold plant.

District Mission and Goals

CCWD's mission is to strategically provide a reliable supply of high quality water at the lowest cost possible, in an environmentally responsible manner. The mission can be fulfilled through the accomplishment of the following CCWD goals:

- Effectively manage the District's financial resources in conformance with Board policies.
- Create and maintain a work environment that fosters teamwork and individual excellence to ensure quality customer services.
- Ensure that all district activities meet or surpass all applicable laws and regulations.
- Operate/maintain District facilities in a safe and cost effective manner.
- Plan, design and construct facilities consistent with District needs, and the highest industry standards.
- Maintain and enhance effective community relations and public information.
- Ensure high quality water for current and future needs.
- Exercise leadership in water affairs.

Population Trends

The San Francisco Bay Area as a region has experienced a large level of growth in recent decades. The Association of Bay Area Governments (ABAG) makes population, household, and economic forecasts for the nine-county Bay Area. Population in the County has grown rapidly due to the availability of land and the trend toward increased suburban growth. There has been ongoing development occurring in the East County area from Pittsburg east to the County Line. Population projections based on 2005 ABAG projections are provided in Table 2-1.

The District's service area includes a large industrial base that includes oil refineries, steel mills, and chemical manufacturing facilities. Large industrial use accounts for approximately one-third of total water use within the District.

TABLE 2-1. POPULATION TRENDS ^(a)

Service Area	2005	2010	2015	2020	2025	2030
Treated Water Service Area (Clayton, Clyde, Concord, Martinez, Pacheco, Pleasant Hill, Port Costa, Walnut Creek, and unincorporated)	207,313	212,958	221,102	230,146	240,429	249,525
Raw Water Service Area (Antioch, Bay Point, Brentwood overlap area, Martinez, Oakley, and Pittsburg)	252,559	266,929	282,379	298,930	312,880	327,020
Other Unincorporated Areas ^(b) (Bethel Island, Cypress Corridor, Knightsen, and Veale Tract)	9,860	13,490	17,290	21,090	21,475	21,860
Subtotal	469,732	493,377	520,771	550,166	574,784	598,405
City of Brentwood (remaining) ^(c)	38,091	42,881	44,171	44,960	48,060	50,860
Total	507,823	536,258	564,942	595,126	622,844	649,265

(a) ABAG's Projections 2005.

(b) Areas within CCWD's service area or planning areas of its customers.

(c) In 2004, the District entered into an agreement to treat water for the City of Brentwood. Under the agreement, the District will construct and operate a treatment plant to be built adjacent to the Randall-Bold Treatment Plant by 2007.

The 5,280-acre Concord Naval Weapons Station (CNWS) offers significant development potential if the 2005 military base realignment and closure (BRAC) process, authorized by Congress, makes this site available for civilian use. The CNWS has been identified as an "infill site" in the City of Concord but future land use options have not yet been developed.

Climate

CCWD's service area generally has hot, dry summers and cool and wet winters. In summer a steady marine wind blows through the Golden Gate and up the Carquinez Strait. Velocities of 15 to 25 knots or more are common late in the afternoon and in the evening, generally 10 knots or less in the morning. The jet of air sweeping eastward through the straits curls northward and southward in the vicinity of Antioch. In December and January, tule fog is common and may last for several days. Frequently this fog drifts into the small inland valleys.

Average annual precipitation ranges from approximately 13 inches in Brentwood to 22 inches in Walnut Creek. The differences reflect proximity to the coast. Table 2-2 shows the average monthly and annual evapotranspiration, precipitation and temperature for the Brentwood and Walnut Creek weather stations.

TABLE 2-2. CLIMATE CHARACTERISTICS

	Brentwood			Walnut Creek		
	Monthly Average ETo	Average Rainfall (inches)	Average Temp (°F)	Monthly Average ETo	Average Rainfall (inches)	Average Temp (°F)
January	0.95	2.72	46	0.82	5.18	47
February	1.75	2.73	51	1.47	4.71	51
March	3.48	1.51	56	2.92	3.19	54
April	5.37	0.68	60	4.40	1.07	58
May	6.88	0.64	65	5.57	1.08	62
June	7.79	0.32	70	6.66	0.32	67
July	8.29	0.08	73	7.40	0.02	69
August	7.24	0.16	72	6.35	0.23	70
September	5.33	0.29	69	4.73	0.21	68
October	3.63	0.73	63	3.34	0.80	63
November	1.76	1.33	52	1.54	2.29	54
December	1.01	2.34	44	1.01	3.55	47
Annual	53.48	13.53	60	46.21	22.65	59

Source: California Irrigation Management Information Service (CIMIS) database for the Brentwood and Walnut Creek weather stations.

Major Facilities

Raw Water Conveyance

The primary conveyance facility for CCWD's raw water supply is the Contra Costa Canal (Canal), which carries water from Rock Slough for deliveries throughout CCWD's service area. The Canal is approximately 48 miles long, with the major deliveries within the first 19 miles, which run from Rock Slough to the Shortcut Pipeline near the Bollman Water Treatment Plant. The first 4 miles of the canal are unlined and run from Rock Slough to Pumping Plant 1. The remaining reaches are concrete lined, with capacities ranging from approximately 22 cfs to 350 cfs. Four pumping plants, within the first 7.1 miles of the canal lift water 124 feet to flow the remaining length of the main canal by gravity. The Ygnacio Relift Pump Station diverts water from the main canal into the 5-mile Ygnacio Loop. The canal has several in-line siphons, culverts, and check structures, as well as a 1/4-mile long tunnel. The Shortcut Pipeline conveys water from Reach 9 of the canal to the Bollman Water Treatment Plant and to the City of Martinez and Shell Oil Company as well as some smaller wholesale industrial customers.

The Los Vaqueros Project included a new point of diversion (at Old River south of the Highway 4 crossing) that operates in conjunction with the current Rock Slough diversion point, associated water transmission facilities, pumping plants, and other facilities. The first pumping plant is at the Old River intake and has an installed capacity of 250 cfs. The Old River pumping facility supplies raw water to the Contra Costa Canal and is used to replenish the Los Vaqueros reservoir. The Old River Pump Station pumps water to the 4 million gallon Transfer Reservoir. From the Transfer Reservoir water is either allowed to flow by gravity to the Canal or is pumped up to the Los Vaqueros Reservoir by the Transfer Pump Station. Water stored in the Los Vaqueros Reservoir is conveyed to the canal by gravity. The Transfer Pumping Plant has an installed capacity of 200 cfs. Diversion from the Old River intake for delivery to CCWD's service area began in the summer of 1997.

Raw Water Reservoirs

CCWD's raw water storage reservoirs are Mallard, Contra Loma, Martinez and Los Vaqueros. Figure 2-1 shows the locations of these raw water reservoirs, the Los Vaqueros Reservoir watershed boundary, and other CCWD facilities. Mallard Reservoir provides water to Bollman Water Treatment Plant and is used as a storage facility for emergency use, flow regulation, and to provide blending of the different sources of supply during winter months when Mallard Slough water is used. The reservoir has a usable capacity of about 2,100 acre-feet, which is currently equivalent to about two weeks of supply during maximum demand for the Treated Water Service Area (TWSA) customers.

Contra Loma Reservoir is used primarily as a regulating reservoir for peak demands and short-term (1 to 7 days) supplies and for emergency storage for CCWD's customers. The reservoir has an available capacity of about 1,700 acre-feet.

Martinez Reservoir, located in the City of Martinez, is at the terminus of the Canal and the Shortcut Pipeline and provides regulating storage to capture flows from Canal operations. The Martinez Reservoir has an available capacity of about 230 acre-feet.

The Los Vaqueros Reservoir was completed in 1998 (initial filling was completed in January 1999). The 100,000 acre-foot reservoir is located eight miles south of the City of Brentwood. The reservoir stores higher quality Delta water for blending with the Delta supply during dry periods when sodium and chloride levels typically increase. Besides improving water quality for CCWD's approximately 510,000 customers, the reservoir stores water for emergency supply (minimum 3-month emergency supply) and for operational flexibility to protect fisheries.

Water Treatment and Conveyance Facilities

The Bollman Water Treatment Plant is the District's primary water treatment facility providing treated water to the District's treated water service area. The plant's treatment process includes coagulation, flocculation, sedimentation, filtration, ozonation, and disinfection. The current permitted capacity of the plant is 75 million gallons per day (mgd). Water is pumped from the plant to the eight-pressure zone distribution system through approximately 800 miles of pipeline ranging in diameter from 2 to 66 inches.

FIGURE 2-1 MAJOR FACILITIES



The Randall-Bold Water Treatment Plant is located in the city of Oakley and is jointly owned by DWD and CCWD. The DWD portion of the facility delivers treated water to the City of Oakley while the CCWD portion delivers treated water to the Cities of Brentwood and Antioch and the TWSA. The treatment plant's current rated capacity is 40 mgd and treatment facilities include a grit basin, influent mixing basin, pre and post ozone contact basin, flocculation basin, deep bed filtration, granular activated carbon, filtered water reservoir, and distribution pumps. A project is currently underway to add sedimentation basins at the Randall-Bold Water Treatment Plant. The Randall-Bold Sedimentation Basins project will improve delivered water quality and enhance the plant's ability to reliably deliver required flows.

CCWD completed a 22-mile Multi-purpose Pipeline (MPP) in 2003 to increase system conveyance capacity and to improve reliability. The MPP's primary mode of operation is to deliver treated water from the Randall-Bold Water Treatment Plant to customers in Central County, freeing up capacity in the Canal for use by wholesale municipal and industrial customers.

In 2004, CCWD entered into an agreement to treat water for a major new customer, the City of Brentwood. Under the agreement, the District will construct and operate a 15 mgd treatment plant to be built adjacent to the Randall-Bold Water Treatment Plant by 2007. The plant will ultimately be expanded to 30 mgd to meet future needs of the City.

Water from the Canal is also treated by non-District treatment plants in the communities of Bay Point (Southern California Water Company), and the cities of Antioch, Pittsburg, and Martinez for delivery to their respective customers. These treatment plants are owned and operated by CCWD's wholesale customers.

Step Three and Step Four. Water Sources (Supply) and Reliability of Supply

10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments [to 20 years or as far as data is available.]

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.

(2) A single dry water year.

(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

Water Supply Sources

CCWD is almost entirely dependent on the Delta for its water supply. CCWD's primary source is the United States Bureau of Reclamation's (USBR) Central Valley Project (CVP). CVP water consists of unregulated and regulated flows from storage releases from Shasta, Folsom, and Clair Engle reservoirs into the Sacramento River. Other sources include the San Joaquin River, Mallard Slough, recycled water, a minor amount of local well water, and water transfers.

Central Valley Project Supply

CCWD's long-term CVP contract was renewed in May 2005 and has a term of 40 years. The contract with the USBR provides for a maximum delivery of 195,000 af/yr from the CVP, with a reduction in deliveries during water shortages including regulatory restrictions and drought. The M&I Water Shortage Policy defines the reliability of CCWD's CVP supply and was developed by USBR to establish CVP water supply levels that would sustain urban areas during severe or continuing droughts. The M&I Water Shortage policy provides for a minimum allocation of 75 percent of adjusted historical use until irrigation allocations fall below 25 percent.

Los Vaqueros Water Rights

CCWD obtained additional water rights for surplus Delta flows as part of the Los Vaqueros Project. Up to 95,980 acre-feet may be diverted for storage in Los Vaqueros between November 1 of each year to June 30 of the succeeding year under Water Rights Permit No. 20749. The Los Vaqueros Water Right supply can be used in lieu of the CVP supply. When Los Vaqueros water rights water is used, CVP supplies are reduced by an identical amount. Combined deliveries of Los Vaqueros Water Rights water and CVP water are limited to 195,000 acre-feet/year. Little or no Los Vaqueros Water Rights water is available for diversion to storage in dry years.

Industrial Diversions

Inland Container (formerly Gaylord Container) and Tesoro (formerly Tosco Corporation) have rights to divert up to 28,000 af/yr and 16,650 af/yr, respectively. Other industries that hold rights to water from the San Joaquin River are Dupont and USS-Posco. These supplies, like the Mallard Slough supply, are variable because of poor water quality that often exists in the San Joaquin River.

Mallard Slough Supply

CCWD has additional water rights at Mallard Slough for a maximum diversion of Delta water of up to 26,700 af/yr. Diversions from Mallard Slough are unreliable due to frequently poor water quality in the San Joaquin River at this point of diversion. Water quality conditions have restricted diversions from Mallard Slough to approximately 3,100 acre-feet per year (on average) with none available in dry years. When Mallard Slough supplies are used, CVP diversions are reduced by an equivalent amount.

Groundwater

Groundwater resources in the CCWD Service Area do not supply significant amounts of water to meet or augment raw water demands. Of the three discernable groundwater sources - Ygnacio, Clayton and the Pittsburg/Antioch Areas - only the Clayton area produces appreciable amounts of groundwater. There are an undetermined number of wells throughout the CCWD service area owned by industries, private individuals, and public municipal water utilities. CCWD does not manage groundwater, and does not have figures as to how much water is pumped from these wells, but estimates total use within CCWD boundaries at approximately 3,000 af/yr. Existing CCWD wells in the vicinity of the Bollman Water Treatment Plant (Mallard Well Fields) can provide approximately 1,000 af/yr but are limited by the threat of contamination from adjacent industrial areas and physical factors such as air entrapment. The Diablo Water District is currently constructing a groundwater blending facility that will provide approximately 500 af/yr.

East Contra Costa Irrigation District

CCWD has entered into an agreement with the East Contra Costa Irrigation District (ECCID) in 2000 to purchase surplus irrigation water to be used for M&I purposes in ECCID's service area. Only a portion of ECCID is within the existing CCWD service area (estimated current demand of 5,700 af/yr). The current ECCID agreement allows CCWD to purchase up to 8,200 af/yr for service in the overlap area with ECCID. The agreement also includes an option for up to 4,000 af/yr of groundwater (by exchanges) when the CVP is in a shortage situation. This exchange water can be used anywhere within CCWD's service area.

Recycled Water

In 1995, CCCSD and CCWD reached an agreement allowing CCCSD to purvey recycled water to areas in Concord and Pleasant Hill. Sixty-one customers were identified in the agreement as potential recycled water users with a total potential recycled water demand of approximately

1,600 af/yr. CCCSD currently serves a number of these customers including two golf courses, a community college, an elementary school, two middle schools, a high school, and the City of Pleasant Hill. Potential projects have also been identified to expand the customer base for landscape irrigation into North Concord, Martinez, and Walnut Creek.

In 2000, DDS and CCWD reached an agreement for DDS to purvey up to 8,600 af/yr of tertiary treated recycled water to the Delta Energy Center and the Los Medanos Energy Center and 20 acres of parks and landscaped areas for an additional 80 af/yr. Both energy centers were operational by 2002. This project is the largest industrial recycled water project in the State of California.

In 2004, DDS and CCWD reached an additional agreement allowing the development of recycled water facilities that will provide up to 1,650 af/yr to areas in Pittsburg and Antioch. The recycled water would be for urban landscape and golf course irrigation uses.

Antioch

The City of Antioch has rights to water from the San Joaquin River and can currently divert water at a rate up to 25 cfs. Actual diversions from the river are limited due to the poor water quality that often exists in the San Joaquin River. Antioch therefore relies on raw water deliveries from CCWD to meet remaining customer demand.

Future Water Supply Implementation

CCWD completed the Future Water Supply Study (FWSS) in 1996 to identify alternatives to offer customers a high quality, reliable supply for the next 50 years. The FWSS was updated in 2002. The FWSS examined water demand, conservation, and existing and potential supplies for a range of service area alternatives. The District's Board of Directors adopted the FWSS, including the Preferred Alternative and Implementation Plan. The Preferred Alternative provides drought reliability and operational flexibility in the short-term while maintaining long-term supply targets to meet projected demands. The Preferred Alternative includes the following actions to meet future demand:

- Re-negotiation of the District's existing CVP Amendatory contract (I75r-3401) prior to the year 2010. This was completed in May 2005.
- Implementation of an expanded District-wide conservation program (known as CPA 1) to encompass wholesale and retail customers, which would achieve a target of at least 5 percent District-Wide savings by the year 2040. These savings are in addition to conservation savings expected from non-District activities; and
- The completion of two or more water transfers to: (1) strengthen the reliability of supplies and drought protection for existing customers, and (2) bridge the gap between water supplies and projected demands. Transfers would be pursued in incremental blocks tied specifically to approved growth within the District.

Projected Water Supplies

Table 2-3 presents the existing and planned sources of supply and their expected availability under various supply conditions in five-year increments over the next 25 years.

TABLE 2-3. PROJECTED WATER SUPPLY											
Condition	CVP ^(a) (af/yr)	Industrial Diversions (af/yr)	Mallard Slough ^(b) (af/yr)	Antioch Diver- sions ^c (af/yr)	Ground- water ^(d) (af/yr)	ECCID Purchases (af/yr)	Recycled Water (af/yr)	Total Firm Supply (af/yr)	Conser- vation savings ^(e) (af/yr)	Planned Purchases ^(f) (af/yr)	Total Planned Supply (af/yr)
2005											
Normal	174,100	10,000	3,100	6,700	3,000	5,700	7,500	210,100	-	-	210,100
Single-Year Drought	148,000	0	0	0	3,000	9,700	7,500	168,200	-	-	168,200
Multi-Year Drought (yr 1)	148,000	0	0	0	3,000	9,700	7,500	168,200	-	-	168,200
Multi-Year Drought (yr 2)	130,600	0	0	0	3,000	9,700	7,500	150,800	-	-	150,800
Multi-Year Drought (yr 3)	113,200	0	0	0	3,000	9,700	7,500	133,400	-	-	133,400
2010											
Normal	194,700	10,000	3,100	6,700	3,000	7,000	12,000	236,500	3,800	-	240,300
Single-Year Drought	165,500	0	0	0	3,000	11,000	12,000	191,500	3,800	-	195,300
Multi-Year Drought (yr 1)	165,500	0	0	0	3,000	11,000	12,000	191,500	3,800	-	195,300
Multi-Year Drought (yr 2)	146,000	0	0	0	3,000	11,000	12,000	172,000	3,800	9,000	184,800
Multi-Year Drought (yr 3)	126,600	0	0	0	3,000	11,000	12,000	152,600	3,800	9,000	165,400
2015											
Normal	195,000	10,000	3,100	6,700	3,000	8,200	12,000	238,000	6,200	-	244,200
Single-Year Drought	165,800	0	0	0	3,000	12,200	12,000	193,000	6,200	5,000	204,200
Multi-Year Drought (yr 1)	165,800	0	0	0	3,000	12,200	12,000	193,000	6,200	5,000	204,200
Multi-Year Drought (yr 2)	146,300	0	0	0	3,000	12,200	12,000	173,500	6,200	13,000	192,700
Multi-Year Drought (yr 3)	126,800	0	0	0	3,000	12,200	12,000	154,000	6,200	13,000	173,200

Continued on next page

Urban Water Management Plan

TABLE 2-3. PROJECTED WATER SUPPLY (continued)

Condition	CVP ^(a) (af/yr)	Industrial Diversions (af/yr)	Mallard Slough ^(b) (af/yr)	Antioch Diversions ^(c) (af/yr)	Ground- water ^(d) (af/yr)	ECCID Purchases (af/yr)	Recycled Water (af/yr)	Total Firm Supply (af/yr)	Conser- vation savings ^(e) (af/yr)	Planned Purchases ^(f) (af/yr)	Total Planned Supply (af/yr)
2020											
Normal	195,000	10,000	3,100	6,700	3,000	8,200	12,000	238,000	8,500	-	246,500
Single-Year Drought	165,800	0	0	0	3,000	12,200	12,000	193,000	8,500	11,000	212,500
Multi-Year Drought (yr 1)	165,800	0	0	0	3,000	12,200	12,000	193,000	8,500	11,000	212,500
Multi-Year Drought (yr 2)	146,300	0	0	0	3,000	12,200	12,000	173,500	8,500	18,000	200,000
Multi-Year Drought (yr 3)	126,800	0	0	0	3,000	12,200	12,000	154,000	8,500	18,000	180,500
2025											
Normal	195,000	10,000	3,100	6,700	3,000	8,200	12,000	238,000	11,100	-	249,100
Single-Year Drought	165,800	0	0	0	3,000	12,200	12,000	193,000	11,100	14,000	218,100
Multi-Year Drought (yr 1)	165,800	0	0	0	3,000	12,200	12,000	193,000	11,100	14,000	218,100
Multi-Year Drought (yr 2)	146,300	0	0	0	3,000	12,200	12,000	173,500	11,100	19,500	204,100
Multi-Year Drought (yr 3)	126,800	0	0	0	3,000	12,200	12,000	154,000	11,100	19,500	184,600
2030											
Normal	195,000	10,000	3,100	6,700	3,000	8,200	12,000	238,000	13,600	-	251,600
Single-Year Drought	165,800	0	0	0	3,000	12,200	12,000	193,000	13,600	16,000	222,600
Multi-Year Drought (yr 1)	165,800	0	0	0	3,000	12,200	12,000	193,000	13,600	16,000	222,600
Multi-Year Drought (yr 2)	146,300	0	0	0	3,000	12,200	12,000	173,500	13,600	21,500	208,600
Multi-Year Drought (yr 3)	126,800	0	0	0	3,000	12,200	12,000	154,000	13,600	21,500	189,100

- a) The CVP conditions used for supply planning are defined as follows: Normal is Adjusted Historical Use. Single Year Drought and Multi-year drought (year 1) is 85 percent of Historical Use. Multi-Year Drought (year 2) is 75 percent of Historical Use. Multi-Year Drought (year 3) is 65 percent of Historical Use.
- b) Average annual diversion over 15-year period (1990 - 2004).
- c) Average annual diversion over 6 year period since pumping plant improvements (1999 - 2004).
- d) Groundwater represents production from Mallard Wells, Diablo Water District wells, and miscellaneous other wells in the District's service area.
- e) Conservation includes savings from District (CPA1) and non-District activities.
- f) Planned purchases consistent with the District's Future Water Supply Implementation Program. The water supply reliability goal adopted by the Board of Directors is to meet at least 85 percent of demand in a 2nd or 3rd dry year and 100 percent of demand in other years.

Step Five. Transfer and Exchange Opportunities

10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

The District's location in the Sacramento-San Joaquin Delta provides access to supplies from the Sacramento and San Joaquin Rivers and their tributaries. In addition, the State Water Project and Central Valley Project direct their supplies through the Delta en route to delivery points in the San Joaquin Valley and Southern California. The District's location provides direct or indirect access to virtually all water supply and storage facilities in the Central Valley. Following is a discussion of the long and short-term transfer and exchange opportunities available to the District.

Long-Term Water Transfers

The FWSS identified water transfers as a preferred means of strengthening drought protection for existing customers and for meeting future supply shortfalls. The purchase of water transfers follows an incrementally stepped approach, triggered by increases in demand resulting from approved growth within the County and cities of the District. The February 2000 Agreement with the East Contra Costa Irrigation District (ECCID) was the first long-term water transfer for the District. It provides up to 8,200 acre-feet in normal years and includes provisions for an additional 4,000 acre-feet through groundwater exchange when the CVP is in a shortage condition. It is estimated that an additional water transfer will be purchased in the next 5 to 10 years. Funding for the purchase of additional supplies is being collected through the District's Facilities Reserve Charge (i.e. new connection fees). The following water transfer opportunities are being evaluated by the District:

Conjunctive Use with Long-term Contract. The District would partner with an agricultural district holding pre-1914 surface water rights and co-invest in conjunctive use facilities, such as new groundwater wells. The new wells would allow the agricultural district to shift use from surface water to groundwater supplies in dry years and exchange its surface water supplies to the District to meet dry-year demand.

Groundwater Banking. The District would extend the reliability of its existing CVP supplies by banking, through groundwater storage, surplus CVP entitlement or other available wet year supplies such as CVP Section 215 water. The District would draw upon the banked water supplies to meet demand when needed.

Lease/Purchase Water Rights and Remarket Surplus Supplies The District would enter into a long-term water supply lease or purchase an existing water right. The lease or sale would be for a fixed amount of annual supplies. All surplus water supplies would be remarketed through a long-term contract with a third-party buyer or the spot market.

Co-Investment in Agricultural Conservation This option would involve forming a long-term relationship with agricultural partner holding pre-1914 water rights. CCWD would invest in agricultural conservation infrastructure, such as canal lining and weed abatement projects. A

fixed amount of conserved supplies would be made available to CCWD annually and any surplus supplies could be banked through groundwater storage or remarketed.

Fallowing or Crop Shifting Option Contract This option includes a long-term option contract with an agricultural district. When called upon by CCWD through exercise of the option, the agricultural district would fallow land or shift crops to make water supplies available.

Short-Term Water Transfers

The District has experience in implementing short-term water transfers. The District purchased approximately 3,400 acre-feet of water from Western Water in calendar year 2000 and 5,000 acre-feet from the Yuba County Water Agency in 2003 and 2004. The goal of the short-term transfer program was to establish relationships with sellers, work through the various institutional issues associated with transfers before a serious water shortage occurs, and to develop water transfer agreements that would allow CCWD to purchase water in shortage years.

Many agricultural districts in Northern California participate in the spot market each year. If required, the District would pursue additional short-term water transfers directly with these agencies. Alternatively, short-term water transfers are available through the Department of Water Resources Dry Year Water Purchase Program.

Step Six. Water Use by Customer-type - Past, Current and Future

10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

- (A) Single-family residential.*
- (B) Multifamily.*
- (C) Commercial.*
- (D) Industrial.*
- (E) Institutional and governmental.*
- (F) Landscape.*
- (G) Sales to other agencies.*
- (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.*
- (2) Agricultural.*
- (3) The water use projections shall be in the same five-year increments described in subdivision (a).*

Table 2-4 presents past, current and projected demand within the CCWD's service area in 5-year increments over the next 25 years. The table reflects total projected water use, irrespective of the source of supply. Existing service area demand is based on 2004 CVP deliveries at CCWD's Rock Slough and Old River intakes, river diversions by the CCWD at Mallard Slough and by the City of Antioch and major industries, and estimates of groundwater use. The demand projections are consistent with the projections presented in the 2002 FWSS. 2010 demand is a projection taken from the FWSS. It shows significant increase in municipal and industrial demand because it includes a placeholder amount to account for uncertainties in land use planning. The placeholder is based on an amount previously used by a large industrial customer. It should be noted that the FWSS projections are increased from current normalized use to buildout conditions using decade intervals. 5-year increments were calculated based on the decade projections.

Urban Water Management Plan

TABLE 2-4. PAST, CURRENT AND PROJECTED WATER USE (af/yr)								
Water Use Sectors	2000	2004	2005	2010	2015	2020	2025	2030
Raw Water Service Area								
Municipal ^(a)	47,057	49,768	52,383	57,708	63,862	70,015	73,912	77,809
Major Industrial/Irrigation/Ag. ^(b)	34,836	42,537	53,507	72,177	72,177	72,177	72,177	72,177
Unincorporated Areas ¹	233	251	259	284	305	326	349	371
Subtotal	82,126	92,556	106,148	130,169	136,344	142,518	146,438	150,357
Treated Water Service Area ^(a)								
Single-family residential	19,502	22,054						
Multi-family residential	5,994	6,325						
Residential Irrigation	1,544	1,791						
Commercial	4,150	4,287						
Comm. & Ind. Irrigation	1,353	1,733						
Industrial	247	247						
Public Authority	1,259	985						
Public Authority Irrigation	723	919						
Private Fire Protection	0	137						
Temporary Service	162	76						
Municipal	43	62						
Treatment Plant use and UAW	6,121	4,830						
Subtotal	41,098	43,446	46,434	51,769	54,162	56,555	57,795	59,034
Other Unincorporated Areas	213	248	262	310	354	398	428	457
Unaccounted for Water ^(c)	10,225	7,500	12,500	12,500	12,500	12,500	12,500	12,500
TOTAL SERVICE AREA ^(d)	133,662	143,750	165,300	194,700	203,400	212,000	217,200	222,300

- (a) Past municipal use includes CCWD sales, City of Antioch diversions, and an estimate of groundwater use of 3,000 af/yr.
- (b) Future projections of major industrial use include a placeholder amount to account for uncertainties in land use planning. The placeholder is based on an amount previously used by a large industrial customer.
- (c) Unaccounted for water includes raw water conveyance losses and Mallard and Los Vaqueros evaporative losses.
- (d) Total service area demand irrespective of source. All projections have been rounded to the nearest hundred af/yr.

Step Seven. Demand Management Measures

10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

CCWD is a signatory to the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) developed by the California Urban Water Conservation Council (CUWCC). The District implements the 14 Best Management Practices (BMPs), as prescribed in the MOU. As described in section 10631 (j) of the Water Code: "*Urban water suppliers that are members of the CUWCC and submit annual reports to that council in accordance with the MOU may submit the annual reports identifying water demand management measures currently being implemented or scheduled for implementation, to satisfy the requirements of subdivision (f) and (g).*"

To meet the requirements of the water code, the following BMP reports were submitted to the CUWCC and are included in Appendix C:

- CCWD Retail BMP Report- FY04
- CCWD Wholesale BMP Report- FY04
- CCWD Retail BMP Report- FY03
- CCWD Wholesale BMP Report- FY03

The following sections are included to provide the reader with an overview of the District's Water Conservation Program:

Program Description

CCWD's Water Conservation Program fulfills the mission of the District by reducing long-term water demand in an environmentally responsible and cost effective manner. The long-term water savings goal for the Conservation Program is to reduce demand by approximately 8,000 acre-feet in the year 2040, which is consistent with the FWSS. This amount is in addition to expected conservation savings from natural fixture replacement and other non-District conservation activities. CCWD is on track to meet this goal.

CCWD offers water conservation programs throughout its retail and wholesale water service area. Activities in the retail service area are included in the Retail BMP Report, and activities in the wholesale service area are included in the Wholesale BMP Report. The programs listed below are offered by CCWD to both retail and wholesale service area customers.

Since CCWD started its Water Conservation Program in 1988, the program has evolved considerably. In its early years, the program consisted of single-family surveys and showerhead distribution. In 1994, the Ultra Low Flow Toilet (ULFT) replacement program was instituted. The Program now includes surveys for all customer classes and incentive programs for numerous devices. Both surveys and replacement programs have changed over the years to increase the effectiveness of the program and the sustainability of water savings. The Water Conservation Program is comprised of several key elements, each of which targets a specific customer base and satisfies the requirements of specific BMPs. The following section summarizes each of the key program elements.

Conservation Survey Programs

Single Family Surveys

The Single Family Residential Survey Program offers free on-site evaluations of home water use. The survey takes between one to two hours to complete, and includes a thorough review of both interior and landscape water uses; however, the primary focus of the survey is landscape water use. The surveyor inspects each irrigation station, and notes specific problems and suggested repairs or improvements. Precipitation tests are conducted on individual sprinkler stations, and a site-specific monthly irrigation schedule is prepared. The schedule is programmed into the controller and the customer is taught how to adjust the timer. After participating in the program, customers are sent four (4) post cards each year to remind them to adjust their watering schedules and to check their irrigation systems.

Since the inception of the program in 1988, CCWD has conducted more than 11,500 single-family surveys.

Multi-Family Surveys

The Multi-Family Residential Survey Program targets apartment complexes and other multi-family customers. The program is marketed to the highest water-using customers and is implemented in conjunction with the MF ULFT Replacement Program. During the survey, plumbing fixtures are flow tested and high-efficiency fixtures are installed or provided to replace high-volume fixtures, such as showerheads, faucet aerators and toilet flappers. A report is provided to the customer that lists the number and location of leaks found, an inventory of toilets by flush volume, and a list of showerheads, aerators or flappers installed. The customer is also provided information about other CCWD programs, such as the ULFT Distribution Program, Large Landscape Survey Program and Commercial Clothes Washer Program.

Since the inception of the program in 1988, CCWD has conducted more than 29,400 multi-family unit surveys.

Commercial, Institutional and Industrial (CII) Surveys

The CII survey program targets a variety of commercial, institutional and industrial customers. Individual water-using devices are inspected, and customers receive a report listing improvements that can be made to the equipment and to the maintenance of that equipment. Rebates are offered as an incentive to upgrade to more efficient equipment.

Since the inception of the program in 1990, CCWD has conducted more than 1,700 CII surveys.

Large Landscape Surveys

The Large Landscape Survey Program targets the highest landscape water users among commercial, institutional or multi-family customers. The survey includes an inspection of the irrigation system and sprinkler precipitation tests on individual stations. A site-specific irrigation schedule is prepared for the property. Additionally, a report is prepared listing equipment improvements, irrigation schedules, and management changes that would result in more efficient water use. Sites with inefficient irrigation timers or other inefficient irrigation devices are encouraged to participate in the irrigation upgrade program, which offers rebates on select irrigation equipment. After participating in the program, customers are sent four (4) post cards each year to remind them to adjust their watering schedules and to check their irrigation systems.

Since the inception of the program in 1990, CCWD has conducted more than 1,400 large landscape surveys.

Conservation Incentive Programs

Residential ULFT Distribution Program

CCWD offers both single family and multi-family residential customers with Free Ultra Low Flow toilets (ULFTs). The program is marketed directly to customers with homes built prior to 1992 and through the survey programs. Eligible customers receive a voucher and pick up their new ULFT at a specific vendor who contracts with the District. Customers are responsible for

installation and the District conducts random inspections to insure proper installation. Multi-family customers who replace more than six toilets receive free delivery. Prior to the ULFT Distribution Program, the District offered rebates to single-family customers as an incentive to install ULFTs.

Since the inception of the program in 1994, CCWD has replaced more than 34,000 toilets with ULFTs.

CII ULFT Replacement Program

The program targets various commercial and institutional customers either through direct mail, bill inserts, or through the CII Survey Program. Customers are offered a rebate of 100% of the material cost up to \$150 per ULFT. In addition, the District negotiated with local plumbing wholesalers to offer select high quality toilets at wholesale prices to any participant. This assures that toilets installed will have long-term savings and customer satisfaction.

Since the inception of the program in 2000, CCWD has replaced more than 1,500 commercial toilets with ULFTs.

Residential High Efficiency Clothes Washer Rebate Program

CCWD, in coordination with six other water agencies, implemented a Bay Area Regional Clothes Washer Rebate Program. CCWD's program has offered rebates from \$50 to \$100 to residential customers who purchase clothes washers with a minimum water use efficiency, or water factor. The program is marketed primarily through the retail appliance stores. In addition, CCWD markets the program through the CCWD bill insert, the Single Family Survey Program, and through newspaper advertisements.

Since the inception of the program in 2000, CCWD has provided more than 7,500 high efficiency clothes washer rebates.

Rinse & Save - Pre-Rinse Spray Nozzle Replacement Program

The Rinse & Save program is part of a statewide program implemented by the California Urban Water Conservation Council (CUWCC). The program offers and installs free pre-rinse nozzles in restaurants and other food industry businesses. These new nozzles reduce hot water use, which results in lower water and energy bills for the customer.

Since the inception of the program in 2003, CCWD has replaced 584 pre-rinse spray nozzles.

Light Wash- Commercial High Efficiency Clothes Washer Rebate Program

The Light Wash program is part of a PG & E service area program administered by Energy Solutions. CCWD offers \$350 rebates to install commercial grade high efficiency clothes washers in apartment common laundry facilities and in commercial laundromats. Both the program administrator and CCWD market to customers and washer suppliers through direct mail.

Since CCWD began providing rebates in 2000, CCWD has provided 283 commercial clothes washer rebates.

Commercial Equipment and Irrigation Upgrade Rebates

In conjunction with the Commercial and Large Landscape Survey Programs, rebates are offered for select plumbing equipment to encourage customers to upgrade to more efficient water fixtures. The program includes rebates for urinals, cooling tower retrofits, and other water-using fixtures. For landscape water use, the program offers rebates for irrigation timers, sprinkler-to-drip retrofits, rain sensors, and sprinkler head upgrades. Pre- and post-inspections are conducted, and rebates are provided based on the material cost of the equipment.

Other Programs

Large Landscape Water Budgets

The Landscape Water Budget Program is directed at those commercial and multi-family sites with dedicated irrigation water accounts. There are approximately 1,200 such accounts in the Treated Water Service Area (TWSA). Water Budgets are prepared using real-time local evapotranspiration (ET_o) data and actual landscape area measurements obtained through an aerial photo. The data is integrated into a detailed water budget equation, which integrates monthly landscape coefficients, irrigation efficiency, and real-time ET_o. Water Budget site reports are prepared comparing the water budget to actual water use. The program provides participating customers with water budget site reports tailored specifically to their properties. These reports enable the customer to adjust their water use to reflect seasonal weather changes and, therefore, control the costs of their water bills.

Green Business Program

CCWD is a sponsor and a participating agency in the Contra Costa County Green Business Program. The Green Business Program is a partnership of environmental agencies, professional associations, waste management agencies, utilities, and a concerned public, working together to recognize and assist business and government agencies that operate in an environmentally friendly manner.

As part of the program, CCWD evaluates water use efficiency for businesses. Customers receive conservation surveys and are offered incentives to upgrade equipment. CCWD provides survey findings to the Contra Costa Clean Water Program, the lead agency for the Green Business Program.

Public Information Program

The CCWD Public Information Office coordinates with the Water Conservation Office to promote water conservation messages and programs through a variety of media. Publications, website pages, presentations, booths at community events, direct mail pieces, newsletters, newspaper ads, and water education programs are all tools used to promote water conservation.

Water Education Program

The goal of the Water Education Program (WEP) is to teach children the importance of water in our lives. CCWD's WEP educates service-area school students about CCWD's mission to deliver clean, safe water in an environmentally responsible manner. Each year, the CCWD's WEP reaches more than 28,000 service-area students and teachers. All of the programs promote

and reinforce the following goals: recognizing activities that could affect water quality; understanding the connection between health and water quality; understanding the biodiversity of a watershed; and, the importance of water conservation.

Accomplishments

CCWD has actively and consistently implemented a variety of quality water conservation programs since 1988. Table 2-5 lists the water conservation programs and savings estimates for each of the activities. The Annual Savings are the savings that are projected to occur during one year (FY06) as a result of all previous years activities that still have residual savings in that year after depreciation. The Cumulative Savings are the sums of each annual year's savings from the inception of the program.

TABLE 2-5. WATER CONSERVATION PROGRAMS									
	Pre-FY01	FY01	FY02	FY03	FY04	FY05	Total	Annual Savings (AF in FY06)	Cumulative Savings (AF)
SF Surveys	8,587	496	614	563	752	578	11,640	218	3,130
MF Surveys	21,891	2,604	1,120	1,250	1,218	1,374	29,457	249	2,708
CII Surveys	1,187	80	116	103	120	117	1,723	459	4,319
Landscape Surveys	971	82	80	104	107	97	1,441	391	4,481
SF Showerheads	13,711	180	298	276	297	156	14,918	59	803
MF Showerheads	6,768	1,080	208	289	400	184	8,929	27	253
Residential ULFTs	22,812	2,941	1,630	1,976	2,177	2,357	33,856	997	6,964
CII ULFTs	12	80	116	103	120	232	1,532	53	149
SF Washers	89	766	1,538	2,336	918	1,883	7,530	166	470
CII Washers	5	15	22	13	191	37	283	23	53
Pre-Rinse Nozzles	0	0	0	229	118	235	582	102	202
CII Low Flow Urinals	7	47	26	9	18	12	115	2	9
CII Low Flow Faucets	34	27	33	12	22	0	128	1	4
'Smart' Sprinkler Timers	0	0	1	16	16	8	40	19	45
Standard Sprinkler Timers	66	5	2	1	6	1	81	13	117
Drip Retrofit (stations)	19	11	18	0	13	19	80	4	17
Rain Sensors	57	0	0	0	23	0	80	2	20
Sprinklers Replaced	682	63	221	34	1,223	684	2,903	2	7
Total								2,787	23,751

* Note, the activities listed above reflect the total activities conducted in both the retail and wholesale service areas.

CCWD has successfully developed, implemented, and maintained an effective water conservation program since 1988. Current water use levels within CCWD are below pre-drought (mid 80's) levels, despite an increase in service area population of 37% since 1985.

CCWD was the recipient of the U.S. Bureau of Reclamation (USBR) 2003 Commissioner's Water Conservation Award for the Mid-Pacific Region. The award is given to entities that have demonstrated significant accomplishments in improving water use efficiency. CCWD was recognized by USBR for its progressive and successful water conservation program including one of the most accurate, large-scale water budget programs in the State of California.

Beyond the BMPs

CCWD is continually looking for new technologies and opportunities to increase water conservation savings. CCWD uses the BMPs as a guide when designing programs. However, to obtain even more savings, CCWD must go beyond the BMPs. The list below summarizes program elements that go beyond the BMPs.

Single Family Conservation Surveys

CCWD provides a detailed one to two-hour site visit at each home. Every water use is inspected and a detailed report listing suggested improvements is presented to the customer. A site-specific monthly sprinkler schedule is also prepared and CCWD staff program the irrigation timer with the customer. The customer is then taught how to make adjustments to the schedule. After participating in the program, customers are mailed four (4) post cards each year to remind them to adjust their watering schedules and to check their irrigation systems. Although this survey is more time consuming than many traditional surveys, water savings are greater. In a study conducted in 2000, the average survey participant saved more than 20,000 gallons in one year or 55 gallons per day (gpd), the year following the survey. Customers with larger landscapes saved up to 53,000 gallons, or 146 gpd, the year following the survey.

Completed BMPs

Some of the BMPs have on-going commitments and others have a specific activity or water savings goals. For the BMPs that have specific goals, CCWD has met its long-term goal for BMP 1 (MF Surveys), BMP 5 (surveys), BMP 9A (CII ULFTs), and BMP 14 (residential ULFTs). However, CCWD continues to implement these programs to achieve even more savings than prescribed by the BMPs.

Residential High Efficiency Clothes Washer Program

The BMP requires that water agencies offer financial incentives towards the purchase of High Efficiency Clothes Washers if a local energy provider is also offering rebates. Although the local energy provider has not consistently offered rebates, CCWD has had an on-going rebate program for more than five years. In addition, CCWD has partnered with six other Bay Area Water Agencies to provide a Bay Area Regional High Efficiency Clothes Washer Rebate Program. The program offers a tiered rebate to promote the most efficient machines.

High Efficiency Toilets and Urinals

Beginning in FY 07, CCWD will offer incentives for the purchase and installation of high efficiency toilets (HETs) and urinals. The HETs are 1.0 gallon per flush or dual flush toilets (ave. 1.2 gpf). These toilets are 20% more efficient than the standard ULFTs. CCWD hopes to achieve greater savings with these devices and also hopes to initiate market transformation away from ULFTs towards HETs.

In addition to the HETs, CCWD will be offering incentives for the purchase and installation of high efficiency urinals. These fixtures can either be ½ gallon per flush or zero water urinals. Again, the goal is to increase water savings and to initiate market transformation towards these fixtures.

Smart Controllers

CCWD has begun a pilot Smart Controller Rebate Program. This program offers a rebate to commercial and residential customers for the purchase and installation of a new smart controller. Smart controllers are self-adjusting sprinkler timers, which adjust automatically based on real-time local weather changes. This program has a very large savings potential. After the three-year pilot program, water savings and customer satisfaction will be measured to determine continuation of the program.

Step Eight. Evaluation of DMMs not Implemented

10631 (g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

- (1) Take into account economic and non-economic factors, including environmental, social, health, customer impact, and technological factors.*
- (2) Include a cost-benefit analysis, identifying total benefits and total costs.*
- (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.*
- (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.*

This section is not applicable to CCWD. All DMMs are implemented.

Step Nine. Planned Water Supply Projects and Programs

10631 (h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

The FWSS provides the opportunity for CCWD to evaluate alternative ways of meeting future demand in the context of an overall water supply plan. The FWSS is designed to be a flexible “living” document with periodic review and updates to respond to changing conditions and to incorporate new information and technology as it becomes available. The FWSS was completed in 1996 and updated in 2002.

The FWSS included an evaluation of water demand, conservation, and existing and potential sources of supplies including continued use of CVP water, groundwater, recycled water, desalination, and water transfers from other sources in the Sacramento Valley, Sacramento-San Joaquin Delta, the San Joaquin Valley, and eastern Contra Costa County. The Preferred Alternative identified in the FWSS included renewal of CCWD’s water service contract for CVP water, which has been completed; implementation of an expanded conservation program; and water transfers to bridge the gap between projected demand and supplies.

Water Transfers

Water transfers were identified in the FWSS as a preferred means of strengthening drought protection for existing customers and meeting supply shortfalls. The purchase of water transfers would follow an incrementally stepped approach, triggered by increases in demand as a result of approved growth within the County and cities within CCWD. The concept of an incremental stepped approach toward the purchase of water transfers balances CCWD’s reliability needs while minimizing financial risk and avoiding growth-inducing implications. In the short-term, such supplies would assist in meeting demands of existing customers during a drought and compensating for possible reductions in the availability of CVP supplies. In the long term, these same supplies would be used to meet demand of new customers resulting from approved growth of the County and cities.

A February 2000 Agreement with ECCID to transfer surplus irrigation water was the first long-term water transfer for CCWD. The ECCID water transfer provides up to 8,200 acre-feet in normal years and up to 12,200 acre-feet when the CVP is in a shortage situation. The ECCID supply is incorporated in the available supply in Table 2-6. Additional planned purchases of water transfers consistent with CCWD's Future Water Supply Implementation Plan are also shown in Table 2-6.

The water supply reliability goal adopted as part of the FWSS is to provide 100% of demand in normal years and at least 85% of demand in the second and third years of a multiple dry year period. Up to 15% of demand during an extended drought may be met with short-term water transfers or demand management.

Recycled Water

CCWD currently has agreements with CCCSD and DDSD to provide recycled water for appropriate uses including industrial cooling tower supplies and large landscape irrigation. Since 2000, a 12.8 mgd recycled water facility has been completed and provides up to 8,600 af/yr to power plants for cooling and process water and will provide an additional 1,650 af/yr of recycled water to CCWD irrigation customers. New recycled water supplies have been incorporated into CCWD's available supply in Table 2-6.

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TABLE 2-6. FUTURE WATER SUPPLY PROGRAMS

Condition	Demand (af/yr)	Available Supply ^(a) (af/yr)	Supply Deficit (af/yr)	Water Transfers ^(b) (af/yr)	Short-term Demand Management ^(c) (af/yr)
Near-Term					
Normal	143,750	210,100	none	-	-
Single-Year Drought	143,750	168,200	none	-	-
Multi-Year Drought (yr 1)	143,750	168,200	none	-	-
Multi-Year Drought (yr 2)	143,750	150,800	none	-	-
Multi-Year Drought (yr 3)	143,750	133,400	10,350	-	10,350
2010					
Normal	194,700	240,300	none	-	-
Single-Year Drought	194,700	195,300	none	-	-
Multi-Year Drought (yr 1)	194,700	195,300	none	-	-
Multi-Year Drought (yr 2)	194,700	175,800	18,900	9,000	9,900
Multi-Year Drought (yr 3)	194,700	156,400	38,300	9,000	29,300
2015					
Normal	203,400	244,200	none	-	-
Single-Year Drought	203,400	199,200	4,200	5,000	-
Multi-Year Drought (yr 1)	203,400	199,200	4,200	5,000	-
Multi-Year Drought (yr 2)	203,400	179,700	23,700	13,000	10,700
Multi-Year Drought (yr 3)	203,400	160,200	43,200	13,000	30,200
2020					
Normal	212,000	246,500	none	-	-
Single-Year Drought	212,000	201,500	10,500	11,000	-
Multi-Year Drought (yr 1)	212,000	201,500	10,500	11,000	-
Multi-Year Drought (yr 2)	212,000	182,000	30,000	18,000	12,000
Multi-Year Drought (yr 3)	212,000	162,500	49,500	18,000	31,500
2025					
Normal	217,200	249,100	none	-	-
Single-Year Drought	217,200	204,100	13,100	14,000	-
Multi-Year Drought (yr 1)	217,200	204,100	13,100	14,000	-
Multi-Year Drought (yr 2)	217,200	184,600	32,600	19,500	13,100
Multi-Year Drought (yr 3)	217,200	165,100	52,100	19,500	32,600
2030					
Normal	222,300	251,600	none	-	-
Single-Year Drought	222,300	206,600	15,700	16,000	-
Multi-Year Drought (yr 1)	222,300	206,600	15,700	16,000	-
Multi-Year Drought (yr 2)	222,300	187,100	35,200	21,500	13,700
Multi-Year Drought (yr 3)	222,300	167,600	54,700	21,500	33,200

a) See Table 2-4 for details on available supplies.

b) Planned purchases consistent with the District's Future Water Supply Implementation Program. The water supply reliability goal adopted by the Board of Directors is to meet at least 85 percent of demand in a 2nd or 3rd dry year and 100 percent of demand in other years.

c) Beginning in 2010, during the second and third years of a multi-year drought, short-term water purchases in conjunction with a request for up to a 5 and 15 percent, respectively, voluntary short-term conservation would be considered to meet demands.

Step Ten. Development of Desalinated Water

10631(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

The Bay Area's four largest water agencies, CCWD, East Bay Municipal Utility District, San Francisco Public Utilities Commission, and Santa Clara Valley Water District, are jointly exploring the development of regional desalination facilities that could benefit 5.4 million Bay Area residents and businesses served by these agencies. The Bay Area Regional Desalination Project may consist of one or more desalination facilities, with an ultimate total capacity of up to 80 million gallons per day. By pooling resources under the umbrella of a single project, the RDP would maximize benefits and efficiencies and minimize potential environmental impacts associated with pursuing independent desalination projects within a small geographic area along the California coastline. A regional desalination plant would serve as a new, safe, and reliable water supply source that would:

- Provide additional sources of water during emergencies such as earthquakes or levee failures;
- Provide a supplemental supply source during extended drought periods;
- Allow other major facilities such as treatment plants, transmission mains, and pump stations to be taken out of service for an extended period of time for maintenance or repairs; and
- Provide a full-time supplemental water supply to increase the diversity of the agencies' water supply portfolio, which would increase reliability.

The Pre-Feasibility Study concluded that there are at least three locations in the Bay Area where a regional desalination facility could be located without any fatal flaws. The 3 sites that ranked the highest are:

- East Contra Costa County site, Pittsburg-Antioch area
- Near Bay Bridge site, Oakland
- Oceanside site, San Francisco

The Delta Diablo Sanitation District completed a feasibility level desalination facility cost study in 2005 that considered the viability of using brackish water typical of the water available in the lower San Joaquin River and Suisun Bay Delta areas. A detailed feasibility study for the Regional Desalination Project will be conducted during 2005-2006 as the next step. This level of study is needed to provide more information on potential benefits, institutional arrangements, location and type of facilities, appropriate technologies, environmental impacts, and to estimate costs of the various options. Public outreach would also occur during this phase of the project.

After comprehensive technical, environmental, regulatory and cost information is available, a project description would be developed and the elected boards of participating agencies would make decisions about how to proceed with desalination facilities. If a specific project is selected, necessary interagency agreements would be developed to finance, design, build, and operate the facilities. The pilot plant, environmental review process, design and construction would occur during the ensuing years and state and federal funding will be sought after to continue the development of the project.

SECTION 3: Determination of DMM Implementation

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

The Urban Water Management Planning Act requires the Department of Water Resources to consider whether an urban supplier is implementing, or has scheduled for implementation, the water demand management measures identified in the supplier's UWMP in evaluating applications for grants and loans. CCWD is a signatory to the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) developed by the California Urban Water Conservation Council. CCWD implements the 14 Best Management Practices (BMPs or DMMs), as prescribed in the MOU and Urban Water Management Planning Act. The following annual BMP reports are provided in Appendix C.

- CCWD Retail BMP Report- FY03
- CCWD Wholesale BMP Report- FY03
- CCWD Retail BMP Report- FY04
- CCWD Wholesale BMP Report- FY04

SECTION 4: Water Shortage Contingency Plan

10632. The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

This chapter contains CCWD's Water Shortage Contingency Plan (Shortage Plan) that addresses the water management practices required during a drought or other interruption of water supplies. The Shortage Plan helps CCWD consider impacts of short-term supply deficiency including financial hardship on both the community and CCWD, and deterioration of customer relations. CCWD uses shortage planning to anticipate drought conditions and to prepare for catastrophic interruptions in water supply. As the District's conservation program is implemented and long-term hard conservation savings are realized, the drought contingency plan required as part of the UWMP will need to be coordinated with updates to the FWSS.

Step One. Stages of Action

10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

Demand Reduction Stages and Goals

This section discusses the projected supply shortfall as it is used to trigger the adoption of a stage appropriate to the severity of the water shortage. To manage a water supply shortfall condition, four demand reduction stages have been defined. The total demand reduction goal for each stage increases from less than 10 percent up to 50 percent of normal demand from Stage I to Stage IV. Stages I and II involve voluntary customer demand reduction measures and Stages III and IV impose mandatory measures including allotments and overuse charges.

The water supply reliability goal adopted in the FWSS is to meet 100 percent of demand in normal years, and at least 85 percent of demand in a multi-year drought. Stages I and II may be implemented in response to drought to obtain up to a 15 percent reduction in demand. Stages III and IV are expected to be implemented in response to a catastrophic interruption in supply such as an earthquake or other emergency. Table 4-1 summarizes the four stages.

TABLE 4-1. DEMAND REDUCTION STAGES AND GOALS			
Stage	Supply Shortage Stage	Description	Total Available Supply
I	Up to 10%	Voluntary Conservation	90%
II	10 - 20%	Water Alert	80-90%
III	20 - 35%	Water Emergency	65-80%
IV	30 - 50%	Water Crisis	Public Health & Safety

Water supply shortage is the difference between demand and the sum of the reduced CVP allocation and additional secure sources of supply. The demand reduction stages roughly correspond to the allocation of CCWD's CVP supply. The District's CVP allocation is defined in the CVP water service contract and the M&I Water Shortage Policy. The M&I Water Shortage Policy was developed by USBR to (1) define water shortage terms and conditions applicable to all CVP M&I contractors, as appropriate; (2) establish CVP water supply levels that would sustain urban areas during droughts, and during severe or continuing droughts would assist the M&I contractors in their efforts to protect public health and safety; and (3) provide information to M&I contractors for development of drought contingency plans. The M&I Water Shortage policy provides for a minimum shortage allocation of 75 percent of adjusted historical use until irrigation allocations fall below 25 percent. In addition, USBR will deliver CVP water to CCWD at not less than a public health and safety water supply level, provided CVP water is available, if the Governor declares an emergency due to water shortage or if an emergency exists due to water shortage. CCWD's CVP allocation during a minimum public health and safety condition shall be sufficient to satisfy public health and safety requirements and was determined

by CCWD to be 65% of normal demand.

Example Customer Reduction Goals

Sample customer class reduction goals under the various supply shortage stages are shown in Table 4-2. These allotments are provided as an example of how to achieve the overall desired reduction goal while acknowledging the constraints various customer classes may have in effecting short-term demand reduction. Alternative allocations may be considered at the time a given stage is implemented. The Board of Directors has recognized in the past that industrial customers cannot sustain the same percentage cutback as municipal customers without severe economic hardship. Therefore, it is proposed to keep reductions to industrial customers to less than 10%, and in most cases to have a goal of no more than 5%. It was also recognized that multifamily residential water users have primarily indoor water use and cannot reduce their water use as much as the single-family residences, which typically have nearly half of their water, use as outdoor uses. The use of increments of five in choosing the reduction goals facilitates CCWD in communicating its reduction goals to its customers.

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TABLE 4-2. EXAMPLE CUSTOMER REDUCTION GOALS

Water Use Sectors	2004 Sales (AF)	% of Total Sales	Stage I 0-10% ^(a)		Stage II 10-20% ^(a)		Stage III ^(b) 20-35% ^(a)		Stage IV ^(b) 35-50% ^(a)		Maximum ^(b) 50%	
			Goal (%)	Sales (AF)	Goal (%)	Sales (AF)	Goal (%)	Sales (AF)	Goal (%)	Sales (AF)	Goal (%)	Sales (AF)
Raw Water Service Area												
Municipal	47,434	39%	5%	45,062	15%	40,319	25%	35,576	40%	28,460	50%	23,717
Industrial	33,255	27%	0%	33,255	5%	31,592	5%	31,592	10%	29,930	40%	19,953
Irrigation	1,612	1%	10%	1,451	30%	1,128	75%	403	90%	161	100%	0
Agriculture	184	0%	5%	175	15%	156	25%	138	40%	110	50%	92
Subtotal	82,485	68%		79,943		73,195		67,709		58,661		43,762
Treated Water Service Area												
SF Residential	22,054	18%	5%	20,951	20%	17,643	30%	15,438	45%	12,130	50%	11,027
MF Residential	6,325	5%	5%	6,009	15%	5,376	25%	4,744	40%	3,795	50%	3,163
Irrigation	4,443	4%	10%	3,999	30%	3,110	75%	1,111	90%	444	100%	0
Commercial	4,287	4%	5%	4,073	10%	3,858	20%	3,430	30%	3,001	50%	2,144
Industrial	247	0.2%	0%	247	5%	235	5%	235	10%	222	40%	148
Public Authority	985	1%	5%	936	10%	887	20%	788	30%	690	50%	493
Private Fire Protection	137	0.1%	0%	137	0%	137	0%	137	0%	137	0%	137
Temporary Service	76	0.1%	0%	76	0%	76	100%	0	100%	0	100%	0
Municipal	62	0.1%	5%	59	15%	53	25%	47	40%	37	50%	31
Subtotal	38,616	32%		36,487		31,375		25,930		20,456		17,143
Total	121,101	100%	4%	116,430	14%	104,570	23%	93,639	35%	79,117	50%	60,905

(a) Range in overall reduction goal to be achieved for a given supply reduction stage. A stage's overall reduction goal equals the water supply shortage remaining after supplemental supplies are obtained.

(b) The Urban Water Management Planning Act requires the Plan to consider the reductions necessary to achieve a maximum reduction of 50 percent. Stages III and IV are not expected to be experienced as a result of drought, but rather in response to an emergency situation and exceeds CCWD's estimate of the minimum public health and safety requirement.

Demand Reduction Triggering Mechanisms

A water reduction stage is implemented if a water supply shortfall is forecasted for the upcoming year. The estimate of the supply shortfall is only a rough guess, even as late in the water year as March. Although criteria are described in CCWD's water supply contract to determine CCWD's water allotment, these criteria define CCWD's water supply allotment relative to a "Historical Use."

The level of supply shortfall is expressed as a percent of the normally occurring demand that would need to be reduced to meet the available supplies. Available supplies include CVP, ECCID, and other dry-year purchases. This percent reduction is matched to the total reduction goal shown in Table 4-1 to select the appropriate stage.

Additional factors to be considered in implementing a water reduction stage include:

- Time and circumstances permitting, the stages should be stepped through without skipping stages. This avoids drastic and sometimes unnecessary actions that may cause problems for CCWD including loss of customer confidence, financial shortfall, and difficulties implementing the emergency water reduction program.
- Customer response to the current stage may either require CCWD to implement the next stage or remain at a current stage. The stages allow CCWD to note the customer's response to less severe stages before implementing the stricter stages.
- Predictions of demand are not always accurate. To help determine if the water reduction program is achieving expected results, demands should be monitored monthly during Stage I, weekly during Stage II, and daily during Stages III and IV.

Again, the estimate of the water supply shortage is rough and a contingency should be made to err on the side of achieving a more than adequate water reduction level. Tables 4-3 through 4-6 identify the demand reduction goals for each user class and lists suggested CCWD actions and enforcement methods for each stage.

TABLE 4-3. STAGE I – VOLUNTARY CONSERVATION
Up to 10 Percent Shortage^(a)

CCWD Actions	Water Reduction Goals (% of last non-drought year use)	Penalties
<ul style="list-style-type: none"> • Initiate public information campaign. Explain drought situation to the public and municipal customers. Explain other stages and forecast future actions. Request voluntary water conservation. • Expand commercial conservation assistance program. • Adopt regulations restricting water waste. • Prepare and distribute educational brochures, bill inserts, etc. Distribute technical information to specific customer types on ways to save water. • Coordinate media outreach program. Issue news releases to the media. Begin advertising campaign to remind consumers of the need to save water. • Recruit and train employee volunteers for speakers' bureau. 	<u>Treated Water Voluntary % Reductions:</u>	<u>Water Waste Penalties:</u>
	Single Family 5 – 15%	1. Educational letter
	Multi Family 5 – 10%	
	Commercial 5 – 10%	
	Industrial 0 – 5%	
	Public Authority 5 – 10%	
	Irrigation 10%	
	Municipal 5 – 10%	
	<u>Raw Water Voluntary % Reductions:</u>	
	Municipal 5 – 10%	
	Industrial 0 – 5%	
	Irrigation 10%	
	Agricultural 5 – 15%	

(a) Water supply shortage defined as the difference between demand and the sum of the reduced Bureau allotment and additional secure sources of supply.

Urban Water Management Plan

TABLE 4-4. STAGE II SHORTAGE – WATER ALERT
10-20 Percent Shortage^(a)

CCWD Actions	Water Reduction Goals (% of last non-drought year use)	Penalties
<ul style="list-style-type: none"> Continue rigorous public information campaign. Explain drought conditions. Request voluntary water reductions. Begin water allotment billing procedures to allow customers to track their water use. Do not assess excess use charges. Consider rate schedule to penalize only gross water wasters. Explain new rate structure to customers. Explain further reductions planned in succeeding rationing stages. Intensify commercial conservation assistance program. Intensify residential conservation assistance programs with emphasis on outside water use. Lobby for passage of drought ordinances by appropriate governmental agencies. Increase efficiency of system water supplies. Identify recycled water stations available for construction throughout District service area. Monitor production weekly against desired reduction goals. 	<u>Treated Water Voluntary % Reductions:</u>	<u>Water Waste Penalties:</u>
	Single Family 15 - 25%	1. Educational letter
	Multi Family 10 - 20%	
	Commercial 10 - 20%	
	Industrial 5%	
	Public Authority 10 - 20%	
	Irrigation 30%	
	Municipal 10 - 20%	
	<u>Raw Water Voluntary % Reductions:</u>	
	Municipal 10 - 20%	
	Industrial 5%	
	Irrigation 30%	
	Agricultural 15 - 25%	

(a) Water supply shortage defined as the difference between demand and the sum of the reduced Bureau allotment and additional secure sources of supply.

TABLE 4-5. STAGE III SHORTAGE – WATER EMERGENCY
 20-35 Percent Shortage – Mandatory Reductions^(a)

CCWD Actions	Water Reduction Goals (% of last non-drought year use)	Penalties																						
<ul style="list-style-type: none">Continue water allotment billing procedures but change status from voluntary to mandatory by assessing excess use charges. Adopt rate schedule to penalize all users that exceed their allotments.Require all homes and businesses to have low flow showerheads, toilet displacement devices, pool covers, or ULF toilets before granting an increased allotment.Monitor production daily against necessary reductions.Request special water use restrictions:<ul style="list-style-type: none">main flushing allowed only for emergenciescars washed only with buckets or hoses equipped with shut off valvesmanage water use to stay within allotmentprohibit filling of lakes and pools	<p><u>Treated Water Mandatory % Reductions:</u></p> <table><tr><td>Single Family</td><td>25 - 40%</td></tr><tr><td>Multi Family</td><td>20 - 30%</td></tr><tr><td>Commercial</td><td>20 - 30%</td></tr><tr><td>Industrial</td><td>5%</td></tr><tr><td>Public Authority</td><td>20 - 30%</td></tr><tr><td>Irrigation</td><td>75%</td></tr><tr><td>Municipal</td><td>20 - 30%</td></tr></table> <p><u>Raw Water Mandatory % Reductions:</u></p> <table><tr><td>Municipal</td><td>20 - 30%</td></tr><tr><td>Industrial</td><td>5%</td></tr><tr><td>Irrigation</td><td>75%</td></tr><tr><td>Agriculture</td><td>25 - 40%</td></tr></table>	Single Family	25 - 40%	Multi Family	20 - 30%	Commercial	20 - 30%	Industrial	5%	Public Authority	20 - 30%	Irrigation	75%	Municipal	20 - 30%	Municipal	20 - 30%	Industrial	5%	Irrigation	75%	Agriculture	25 - 40%	<p><u>Water Waste Penalties:</u></p> <ol style="list-style-type: none">Excess use chargesFlow restrictorsFines
Single Family	25 - 40%																							
Multi Family	20 - 30%																							
Commercial	20 - 30%																							
Industrial	5%																							
Public Authority	20 - 30%																							
Irrigation	75%																							
Municipal	20 - 30%																							
Municipal	20 - 30%																							
Industrial	5%																							
Irrigation	75%																							
Agriculture	25 - 40%																							

(a) Water supply shortage defined as the difference between demand and the sum of the reduced Bureau allotment and additional secure sources of supply.

TABLE 4-6. STAGE IV SHORTAGE – WATER CRISIS
30-50 Percent Shortage – Mandatory Reductions^(a)

CCWD Actions	Water Reduction Goals (% of last non-drought year use)	Penalties
<ul style="list-style-type: none"> All of the Stage III steps intensified All public water uses not required for health and safety prohibited unless using tank truck water supplies or recycled wastewater Prohibit new connections 	<u>Treated Water Mandatory % Reductions:</u>	<u>Water Waste Penalties:</u>
	Single Family 40 - 50%	1. Excess use charges
	Multi Family 30 - 50%	2. Flow restrictors
	Commercial 30 - 50%	3. Fines
	Industrial 10 - 35%	
	Public Authority 30 - 50%	
	Irrigation 90-100%	
	Municipal 30 - 50%	
	<u>Raw Water Mandatory % Reductions:</u>	
	Municipal 30 - 50%	
	Industrial 10 - 35%	
	Irrigation 90-100%	
	Agricultural 40 - 50%	

(a) Water supply shortage defined as the difference between demand and the sum of the reduced Bureau allotment and additional secure sources of supply.

Water Allotment Methods

This section identifies suggested water-saving measures associated with the different user types. A key element of this step is involvement of the public in order to create a program that the community understands, contributes to and supports.

CCWD has several allotment method options for use during mandatory rationing (Stages III and IV). Three methods are discussed for both the single-family residential user class and the irrigation services. The percentage reduction method is the only feasible allocation method for the remaining user classes. The methods are described and their advantages and disadvantages are discussed.

The allocation methods discussed here, except the flat allocation, use a “base consumption” for each user to calculate their allocation. The base consumption is an estimate of a user’s current water consumption, by month, if there was no drought. The options for determining the base consumption include, but are not limited to, using the previous year’s consumption or averaging the previous two, three, or four years’ consumption.

Since CCWD continues to grow significantly, and because of a high customer “turnover”, a base year consumption determined from consumption data of more than a few years ago may exclude many present day customers. The determination of the base year consumption should attempt to minimize the number of customers for whom the base consumption is not appropriate (different resident, number of people, etc. during period when base consumption was measured). This will minimize the number of appeals that CCWD receives.

Single Family Residential

The three allocation methods to be considered to achieve a 20 to 50 percent mandatory reduction are:

- Percent reduction
- Flat allocation
- Hybrid flat allocation/percent reduction

Table 4-7 summarizes the advantages and disadvantages of the three allocation method options for single-family residential customers.

TABLE 4-7. ALLOTMENT METHOD OPTIONS – SINGLE FAMILY RESIDENTIAL		
Allotment Method	Advantages	Disadvantages
Percent Reduction	<ul style="list-style-type: none"> • Easy to determine and administer 	<ul style="list-style-type: none"> • Penalizes conservers • Rewards water wasters • Does not provide health and safety requirements in extreme shortages • Encourages water wasting during non-shortage periods • Base monthly consumption must be determined for each customer
Flat Allotment	<ul style="list-style-type: none"> • Easy to determine allotments • Effective for periods of extreme shortage (Stage IV) • Base monthly consumption for each customer is not needed 	<ul style="list-style-type: none"> • Not equitable • Does not recognize customer water use characteristics
Hybrid Percent Reduction/Flat Allotment	<ul style="list-style-type: none"> • Equitable – recognizes customer water use characteristics • Flexible – suitable for all stages • Provides customers greatest control • May minimize customer complaints and appeals 	<ul style="list-style-type: none"> • Additional staff/computer work to determine allotments • Requires more public education • Base monthly consumption must be determined for each customer

Percent Reduction. The allocation is calculated by reducing the user's base year water use, for the specific billing period, by a percentage of the base water use. The percentage reduction is the same for all the users within a user class.

The advantages stem from its simplicity: the method is easy to administer and understand.

The method has several disadvantages: it fails to ensure that basic health and safety requirements are met, it penalizes conservers and, therefore, discourages customers to use water more efficiently during normal years. A user that had reduced his water use to minimum levels during the base year would be required to reduce it further with this method. Users are tempted to artificially raise their base water use by significantly increasing their water use during periods when there is no mandatory rationing. Because this method penalizes conservers and rewards inefficient water users, it is considered the most inequitable method for the residential user class. The need to determine the base monthly consumption for each customer may also be considered a disadvantage.

Flat Allocation. The flat allocation method was used in the 1991 water reduction program. The allocation is calculated by dividing the total water available for the residential user class by the number of services. Appeals are granted for people with special medical needs, residences with more than four people, for the care of livestock, health and safety needs, and unnecessary or undue hardship.

The number of appeals received in 1991 was 5,636 or approximately 10 percent of the total single-family users. None of the three allocation systems described here are expected to reduce this number significantly since all allocation systems must recognize special customer circumstances.

The advantages of the flat allocation method are that its simple to understand and administer, and it ensures that health and safety requirements are met. Also, a base year consumption for each customer is not required. This method may be appropriate for later (Stage III and Stage IV) drought plans because it evenly allocates the minimal amount of water available to all of the users. It is interesting to note that the hybrid flat allocation/percent reduction method defaults to the flat allocation method in the most severe reduction stages.

The major disadvantage of the flat allocation method is that it abruptly imposes households with four or more people and/or homes with substantial landscaping with severe reduction while residences with three or fewer people and/or homes with small landscapes are relatively unaffected. This inequity causes public complaints that overburden District staff. This method may not be appropriate for late Stage II or early Stage III plans because of the inappropriately severe reductions imposed on a substantial portion of the user class.

Hybrid Flat Allotment/Percent Reduction. The “hybrid” method determines a health and safety use, or *essential water use*, and subtracts it from the user’s base consumption to obtain the *non-essential* water use. The user’s water allotment is determined by subtracting a percentage of the non-essential water use, for that customer, from the user’s base demand:

Allocation = base year consumption – percent reduction * non-essential use
where,

essential use = water use for health and safety requirements (see Table 4-4)

non-essential use = base year consumption – essential use

percent reduction = is dependent upon overall reduction goal and is constant for all single family users

The health and safety flat allotment is based on four people and a per capita use of between 50 and 68 gallons per day depending on a Stage III or Stage IV plan.

As noted in the description of the flat allotment method, the hybrid method defaults to the flat allotment method in the water crises (Stage IV) plan; at Stage IV, the non-essential use is zero

and the user's allocation equals the essential water use which is the same for all single family users.

The hybrid method appears to be the most equitable and has been applied with success by the Goleta Water District. Because non-conserving users have larger non-essential water use than conserving households, they realize a larger reduction than conserving users. The hybrid method may have a lower number of appeals than the flat allocation method because the hybrid allocations are based on each user's demand characteristics. Therefore, the hybrid allocation may be more reasonable than the flat allocation. In addition to being more equitable than the other methods discussed, and possibly reducing the number of appeals, the hybrid method also ensures that the health and safety requirements are recognized for all users.

The major disadvantage of the hybrid method is that CCWD's customers may have difficulty understanding it. This difficulty may result in increased customer calls and a more extensive public education effort. Although another water agency has used the method successfully, CCWD has never used it. Implementing the hybrid allocation method, therefore, may have unforeseen technical or logistical difficulties. Also, computing a base consumption for each customer requires more effort.

Multi-family Residential

The multi-family user class, unlike the single-family user class, consists of widely different user characteristics that make the design of an equitable allocation method difficult. For example, there is not always one meter for each apartment and landscaping is sometimes combined and other times separated from indoor use. Unless these differences are denoted within the multi-family class, a percent reduction allocation method appears to be the only reasonable choice.

Irrigation Users

The user classes that almost exclusively use their water for irrigation are the Residential, Commercial and Industrial, Public Authority, and Flat Rate irrigation users. The two water allocation method options that may be considered for the irrigation user classes are:

- Percent reduction
- Irrigation Budget Program

Percent Reduction. The allocation is calculated by reducing a user's base year water use by a percentage of the base water use. The percent reduction is the same for all users within a user class. For the flat rate customers, the base year can be calculated from the customer's irrigated acreage and a water use factor.

Advantages of this method include the ease of its administration and understanding and its effectiveness in reducing water use in a water crisis (Stage IV).

A 75 percent reduction was applied to the irrigation users in 1991. The method was not considered to be satisfactory because, if strictly adhered to by all the irrigation users, there would

be an inappropriately large economic cost to these users with respect to the level of the water shortage. Also, the method was not equitable; customers who had been watering efficiently were unable to maintain their landscapes, whereas previously wasteful customers were impacted less severely.

Irrigation Budget Program. The irrigation budget program offers the irrigation customers a choice between the percent reduction and a method that relates irrigation to the weather and area being irrigated.

The weather and area allocation method uses “The California Irrigation Management Information System” (CIMIS) weather data service and irrigated area to determine the user’s water allocation. The CIMIS weather data service provides a factor that relates plant water requirements to the weather for a specific region. A user’s water allocation is determined by multiplying this factor times the user’s irrigated acreage. The data for the customer budgets would be obtained from the existing large landscape conservation program.

An irrigation budget program can offer irrigation customers an opportunity to maintain their landscaping and reduce their water use significantly. The District’s on-going turf audit program will assist the irrigation customers in complying with their water allocation by providing information on irrigation scheduling and efficient irrigation practices. Note that the District’s current turf audit program has enabled a significant number of irrigation customers to incorporate the CIMIS weather data in their irrigation practices.

The irrigation budget program may generate complaints by users that do not choose the CIMIS weather data method. They may perceive their percent reduction allocation to be more severe than the CIMIS allocations.

An advantage to this method is its effectiveness in addressing all irrigation users. There may be users, for as yet undetermined reasons, that may not like the CIMIS method, or others that do not respond to CCWD’s request for information. The percent reduction, applied as a default method, acts as a “catch all”.

Commercial

The commercial user class covers a variety of water users. The users vary from laundries and linen supplies to restaurants and health care facilities, and from car washes to hotels and retail stores. Each user has significantly different quantities and uses of water. Because of this large variation, the percent reduction appears to be the most realistic water allocation method.

Every effort must be made by CCWD to help the various businesses reduce their water use and minimize economic hardship. There exists an essential water use for each business that, when not met, creates undue economic hardship for that business. CCWD must attempt to assess a business’ essential water use when reviewing an appeal. In a Stage III response, a business’s essential water use may be considered as similar to the health and safety requirement for residential users. However, in a Stage IV (water crisis), a business’ essential water use is secondary to the residential health and safety requirement as shown in Table 4-3.

Educational materials are available from the State Department of Water Resources for the Commercial Service customers to help them reduce their water use. Note that, to appeal for more water, the business must show proof of an attempt to reduce their water use before their appeal can be considered. This may be effective in eliminating the number of “casual” appeals and ensuring that an effort has been made to reduce water use.

Industrial

Industries use approximately one-third of CCWD’s total water use. The industries served by CCWD are a significant source of jobs and revenue for Contra Costa County and the State. Driven by the incentives to reduce costs and the risks of production losses, many industries have aggressively pursued water conservation practices for twenty years. As a result, significant water conservation has been achieved and further water reduction may be more difficult and much more expensive. In 1991 CCWD’s industries reduced water use by 10 to 13 percent. However, industries have initiated significant water efficiency programs since 1991 such as recirculation of process water, additional water treatment to extend uses of the raw water supply, and use of recycled water. In response to a request by CCWD to reduce their water use 15 to 20 percent, industries stated that it could not be achieved unless they shut down production.

A Stage II reduction (10 to 20 percent overall) may be achievable by applying a 0 to 5 percent reduction to the industrial users and imposing larger reductions on other user classes. However, overall reductions for Stage III and IV (20 to 50 percent) may require industries to reduce use by more than 10 percent and risk production shutdown. A percent allocation calculated on a case-by-case basis may be the most equitable allocation method and is feasible because of the small number of industrial customers.

As an option to installing costly additional conservation upgrades or loss of production, industries may be charged a fee to help reduce water use in other user classes. This “mitigation fee” may be used by CCWD to install low flow toilets, fix leaks for schools, or any other water conservation effort. An effective program would set each fee sufficient to reduce water use in other classes by the amount allocated to a given industrial customer.

Public Authority

The Public Authority user class includes schools and public and government buildings. The percent reduction allocation method is the only method considered here because of the customers’ varied water uses.

Municipal

CCWD provides raw water to five municipal customers. The percent reduction method is the only method considered here because of the municipal’s customers varied water uses. Each municipal customer has its own shortage plan and will determine how the overall supply shortage is to be accommodated by their various customer classes.

Agricultural

The agricultural user class could be dealt with in two ways: their allocation could be in proportion to the CVP Agricultural Water allocation (which is likely to considerably less than the M&I level) or they can be treated as any other customer. It is proposed that this class be allocated water in the same proportion as municipal customers. The amount involved is small and would mean only a minor change in allocations to others.

Water Allotment Appeals

A committee is formed to approve, deny, and assess changes to appealed water allocations at the adoption of a Stage III response. The appeal committee formed in 1991 included seven members. The departments represented included Personnel, Finance, Operations and Maintenance, General Management, Engineering and Public Information and Conservation.

The total number of water allocation appeals received as of June 19, 1991 was 5,636 (CCWD, Memorandum dated June 19, 1991). Of these 502 were denied and the remainder, 5,134, were approved.

An allotment appeals process that was distributed to all customers during the 1991 Emergency Water Reduction Plan included five acceptable reasons for variance:

- Medical requirements
- More than four members of the household
- Care of livestock
- Health and safety
- Unnecessary or undue hardship

Requested variances specifically not considered by CCWD in 1991 included:

- For individuals who are not residents of the household for over three months of the calendar year
- To protect investments in landscaping
- To fill decorative lakes, ponds, or fountains
- Landscaping for new hook-ups to the District's system

The appeals process form distributed to the customers listed required information for each variance requested. This information included such items as a copy of the first page of the customer's tax returns, copies of occupants' drivers licenses showing address, physician's note of medical condition, and description of the impacts the cutbacks are expected to have.

Step Two. Three-Year Minimum Water Supply

10632 (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

This section provides an estimate of the minimum water supply available during each of the next three water years under drought and minimum health and safety conditions.

Drought Conditions

The District's primary supply is CVP water obtained under contract with the USBR. The M&I Water Shortage defines the reliability of the District's CVP supply and provides for a minimum shortage allocation of 75 percent of adjusted historical use until irrigation allocations fall below 25 percent. Under drought conditions, the District's CVP supply is assumed to be 75 percent of historical use.

The District's agreement with ECCID provides up to 8,200 acre-feet (current demand is 5,700 acre-feet) for service in the areas common to both Districts. An additional 4,000 acre-feet is available in drought years through groundwater exchange.

The District's Mallard and customer (Industrial and City of Antioch) supplies from the San Joaquin River are not available in drought years due to poor water quality.

Health and Safety Requirements

Table 4-8 indicates per capita health and safety requirements based on commonly accepted estimates of interior residential water use. In Stage I and II shortages, customers may adjust either interior or outdoor water use in order to meet the voluntary reduction goal. The health and safety allotment is based on four people and a per capita use of 68 gallons per day.

TABLE 4-8. PER CAPITA HEALTH AND SAFETY WATER QUANTITY CALCULATIONS		
	Non-Conserving Fixtures	
Toilets	5 flushes x 5.5 gpf	27.5
Shower	5 min x 4.0 gpm	20.0
Washing Machine	12.5 gpcd	12.5
Kitchen	4 gpcd	4.0
Other	4 gpcd	4.0
Total (gpcd)		68.0

Source: California Department of Water Resources

Due to the importance of gasoline and diesel fuel manufacturing to the State's economy, CCWD's minimum public health and safety amount includes an allocation to these key

industries. A curtailment of petroleum fuel production would have severe economic impacts to the State. CCWD's minimum public health and safety allocation from the CVP is 65% of normal demand, which includes a 10% reduction to key industries, minimum interior residential water allocations (68 gpcd), necessary institutional and commercial uses, fire protection, and average system losses.

The District's minimum supply during the next three years under drought and minimum health and safety conditions is shown in Table 4-9.

TABLE 4-9. SUPPLY RELIABILITY DURING THE NEXT THREE YEARS							
Source	Normal (af/yr)	Minimum Supply					
		Year 1 (af/yr)		Year 2 (af/yr)		Year 3 (af/yr)	
		Drought	H&S	Drought	H&S	Drought	H&S
CVP ^(a)	174,100	130,600	113,200	131,900	114,300	133,200	115,400
ECCID	5,700	9,700	9,700	9,700	9,700	9,700	9,700
Industrial Diversions	10,000	0	0	0	0	0	0
Mallard Slough	3,100	0	0	0	0	0	0
Antioch Diversions	6,700	0	0	0	0	0	0
Groundwater	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Recycled Water	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Total	210,100	150,800	133,400	152,100	134,500	153,400	135,600

a) Minimum CVP supply under Drought conditions assumed to be 75% of historical use based on the M&I Water Shortage Policy. Minimum CVP supply under minimum Health and Safety (H&S) conditions is assumed to be 65% of historical use. Historical use is assumed to increase at 1% per year over the next three years.

Step Three. Catastrophic Supply Interruption Plan

10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

CCWD is prepared to address major water shortage emergencies such as a catastrophic supply interruption. Emergency response procedures are described in the Emergency Operations Plan. In addition, the Seismic Reliability and Improvement and Los Vaqueros Projects have been implemented to minimize damage and service interruptions resulting from earthquakes and other disruptions to CCWD's supplies. This section describes these projects in more detail and other short-term supply options available to CCWD during an emergency.

Emergency Operations Plan

In order to protect the public welfare in the event of an emergency, it is essential that the District respond in an expeditious and coordinated manner. CCWD's Emergency Operations Plan (EOP) provides a framework for directing District-wide responses to a broad scope of emergency situations associated with natural disasters, technological incidents, and terrorist operations. It supplements existing operational plans and emergency procedures and reflects CCWD's emergency operations policy.

CCWD cooperates with Contra Costa County, its political subdivisions, and other water districts and utilities within the state to plan for the effective mobilization and utilization of available resources during disasters. During emergencies, CCWD may request mutual aid response through the State Office of Emergency Services. Upon request by the county, state, or other public authority, and when feasible, CCWD may provide personnel, supplies, and equipment resources to other agencies.

Table 4-10 summarizes the actions CCWD has taken to prepare for a water shortage emergency.

TABLE 4-10. PREPARATION ACTIONS FOR A CATASTROPHE	
Examples of Actions	Source
Determine what constitutes a proclamation of a water shortage emergency.	UWMP
Stretch existing water storage.	UWMP
Obtain additional water supplies.	UWMP, FWSS
Develop alternative water supplies.	FWSS
Determine where the funding will come from.	Budget, CIP
Contact and coordinate with other agencies.	EOP
Create an Emergency Response Team/Coordinator.	EOP
Create a catastrophe preparedness plan.	EOP
Put employees/contractors on-call.	EOP
Develop methods to communicate with the public.	EOP
Develop methods to prepare for water quality interruptions.	EOP, LVP
Increase seismic reliability of conveyance and distribution systems	SRIP, CIP
Increase emergency storage	LVP, TWMP

UWMP - CCWD Urban Water Management Plan.

FWSS - CCWD Future Water Supply Study, 1996.

CIP - CCWD Ten Year Capital Improvement Program.

EOP - CCWD Emergency Operations Plan.

SRIP - Seismic Reliability Improvement Project.

LVP - Los Vaqueros Project

TWMP - Treated Water Master Plan

Seismic Reliability and Improvement Project

CCWD completed a Seismic Reliability and Improvements Study of the reliability and capacity of its water distribution facilities in 1997. As a result of the study, CCWD has completed three major capital projects that improve the capacity and reliability of the raw water system to meet future demands, as well as to meet fire flow needs following a major earthquake. These projects are: Raw Water Seismic Improvement Project, which reinforced seven areas of seismic vulnerability along the Contra Costa Canal; the Mallard Slough Pump Station project, which replaced the existing 65 year old Mallard Slough intake at Bay Point; and the Multi-Purpose Pipeline (MPP), which is a 22-mile long pipeline to supplement the capacity of the Contra Costa Canal.

The MPP conveys treated water from the Randall-Bold Water Treatment Plant in Oakley to CCWD's existing water distribution system in Concord, near the Bollman Water Treatment Plant. Under normal operations, the MPP delivers treated water from east to west, to the District's treated water customers. In an emergency, the MPP could also carry water in the reverse direction (from west to east), transporting treated water eastward from the Bollman Water Treatment Plant to customers in Eastern Contra Costa County. The MPP also has several emergency connections to the Canal. If the Canal is damaged during an earthquake or requires maintenance, water could be diverted from the MPP to the Canal around damaged or closed sections using the emergency connections. The MPP serves multiple purposes and greatly improves the existing Canal system reliability for delivery during emergencies.

Los Vaqueros Project

CCWD's Los Vaqueros Project provides 100,000 acre-feet of offstream storage to improve water quality and to provide emergency storage for customers of CCWD. A large portion of the reservoir is reserved for emergency purposes. The reservoir provides up to 70,000 acre-feet of emergency supply in wet years and up to 44,000 acre-feet in dry years. The Los Vaqueros Reservoir provides a minimum of 3 to 6 months of emergency storage that may be utilized during a catastrophic interruption of CCWD's Delta supplies.

Short-term Supplemental Supply Options

The Future Water Supply Study and Implementation Plan were undertaken to strengthen the reliability of supplies for existing customers and to bridge the gap between water supplies and projected demands. The Implementation Plan includes the purchase of water transfers in incremental blocks to meet 100 percent of demand in normal years and at least 85 percent of demand in drought conditions. Additional short-term supplies may be required in response to an emergency or catastrophic interruption of the District's supply. Potential supplemental supplies include spot market water transfers, increased use of groundwater, and increased water recycling. The legal and time constraints, availability, costs, and relative amounts of water determine how and if the supplemental source would be pursued.

Water transfers (through the State Water Bank), increased water recycling, and increased groundwater pumping were used in the drought of 1986 to 1992. CCWD purchased 6,717 and 10,000 acre-feet from the State Water Bank in 1991 and 1992, respectively. During summer of 1991, as a response to drought emergency, approximately 400 acre-feet of recycled water were distributed to Shell and Tosco (now Tesoro) refineries for cooling tower water. A truck fill station was built to provide recycled water for construction uses. Since then, additional recycled water facilities have been constructed by the Delta Diablo Sanitation District and Central Contra Costa Sanitary District for non-potable demands including industrial cooling and irrigation supplies. Utilization of the recycled water facilities could be maximized in response to an emergency.

Groundwater resources in Contra Costa County are limited. Outside of the District only Byron-Bethany Irrigation District, ECCID, and the City of Brentwood have the ability to produce significant amounts of groundwater (approximately 5,000 acre feet annually each). The current ECCID agreement allows CCWD to purchase 4,000 af/yr of groundwater via exchange when the CVP is in a shortage situation. The potential to increase groundwater pumping in East County would be explored in the event of an emergency.

Step Four. Prohibitions, Consumption Reduction Methods and Penalties

10632 (d-f)

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

This section describes CCWD's policies and prohibitions against specific water use practices during water shortages, customer reduction methods, and potential penalties for excessive use.

Mandatory Prohibitions on Water Wasting

Board Resolution No. 93-23 - *Water Waste Prohibitions within the Area Served by the District* includes prohibitions on wasteful water uses such as washing paved or hard-surfaced areas, using single pass cooling systems in new connections, and failure to repair a controllable leak of water. A general policy regarding the practice of waste is also included in CCWD Code of Regulations Section 5.44.010. A summary of Board Resolutions and a list of CCWD Regulations regarding conservation and the UWMP are provided in Appendix D.

Consumption Reduction Methods

A summary of the customer reduction methods that may be utilized by CCWD during a water shortage emergency are summarized in Table 4-11.

TABLE 4-11. CONSUMPTION REDUCTION METHODS

Examples of Consumption Reduction Methods	Stage When Method Takes Effect
Demand reduction program	All stages
Use prohibitions	All stages
Education Program	All Stages
Percentage reduction goal set by customer type	All Stages
Voluntary rationing	I, II
Flow restriction	III, IV
Excessive Use Penalties	III, IV
Plumbing fixture replacement (beyond CPA 1 Program)	III, IV
Mandatory rationing	III, IV
Incentives to reduce water consumption (e.g. water banking)	III, IV
Prohibit new connections	IV
Restrict for only priority uses	IV
Per capita allotment by customer type	IV

Excessive Use Penalties

CCWD's excess use charges for treated water retail customers used in 1991 are shown in Table 4-12. This rate structure is to be reviewed and modified as warranted by the conditions of a specific drought period.

TABLE 4-12. YEAR 1991 EXCESS USE CHARGES

Use Exceeds Allotment by:	Excess Charge
1-10%	2 x unit price
10.01 – 20%	4 x unit price
20.01 – 30%	6 x unit price
30.01 – 40%	8 x unit price
over 40%	10 x unit price
500 gal/day (for single family homes)	Flow restrictor installed

Source: Resolution No. 91-11

Step Five. Revenue/Expenditure Impacts and Measures to Overcome Impacts

10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

This section describes the potential impacts to CCWD's revenue resulting from implementation of temporary consumption reduction actions and measures to overcome those impacts. Customer sales data from 2004 are used as an example of a normal revenue pattern. Table 4-13 shows the normal raw and treated water use levels and the reduced levels associated with each stage (assuming a given stage is in effect for 1 year). To estimate the impact of each stage on revenues, current commodity rates and charges (as of February 2005) are applied to the water use levels in Table 4-13. These revenue reductions are combined with estimated increased expenses resulting from managing the supply shortfall to derive the net revenue shortfalls shown on Table 4-14. To simplify the analysis, only CCWD's revenue most sensitive to variation in annual water use and expenses significantly altered by the managing of a water shortage is included in the tables. The net change from the "normal" water supply condition is identified for the revenue and expense items and represents the total estimated revenue impact.

TABLE 4-13. EXAMPLE WATER SALES BY STAGE

Water Sales ^(a)	Current Use, af/yr	Stage I 0-10% af/yr	Stage II 10-20% af/yr	Stage III 20-35% af/yr	Stage IV 35-50% af/yr	Max. Red. 50% af/yr
Raw Water	82,485	79,943	73,195	67,709	58,661	43,762
Treated Water	38,616	36,487	31,375	25,930	20,456	17,143
Total	121,101	116,430	104,570	93,639	79,117	60,905

(a) CCWD water sales. Totals do not include deliveries from other sources.

TABLE 4-14. EXAMPLE REVENUE IMPACT OF REDUCED CUSTOMER SALES

Revenue/Expenses	2004 Revenue (x1,000)	Stage I 5% ^(a) (x1,000)	Stage II 15% ^(a) (x1,000)	Stage III 25% ^(a) (x1,000)	Stage IV 35% ^(a) (x1,000)	Max. Reduction 50% ^(a) (x1,000)
Revenue Impacted by Shortage						
Treated Water Variable ^(b)	\$39,884	\$37,684	\$32,405	\$26,779	\$21,128	\$17,705
Raw Water Variable ^(c)	\$38,855	\$37,658	\$34,480	\$31,895	\$27,633	\$20,614
TW Facilities Reserve Charge ^(d)	\$5,200	\$5,200	\$5,200	\$5,200	\$-	\$-
Subtotal	\$83,939	\$80,542	\$72,085	\$63,874	\$48,761	\$38,319
Net Revenue Change	\$-	\$(3,397)	\$(11,855)	\$(20,065)	\$(35,179)	\$(45,620)
Operating Expense						
Extra Administrative ^(e)			\$396	\$396	\$396	\$396
CVP Supply Costs ^(f)	\$-	\$(74)	\$(262)	\$(436)	\$(666)	\$(955)
Net Expense Change	\$-	\$(74)	\$133	\$(40)	\$(271)	\$(560)
Estimated Surplus or (Deficiency)	\$-	\$(3,323)	\$(11,988)	\$(20,025)	\$(34,908)	\$(45,060)

(a) The overall reduction goal is shown for each stage, however, these reductions differ from the projected reductions for specific customer classes (see Table 4-2).

(b) Based on rates effective 2/1/05 for treated water quantity charges (\$970/af) and a weighted average of the treated water energy zone surcharge (\$63/af).

(c) Based on rates effective 2/1/05 for raw water quantity charges (\$461/af) and an estimate (\$11/af) for raw water demand charges.

(d) Revenue from the treated water facilities reserve charge is not expected to be affected by a shortage unless a new connection moratorium is imposed under extreme shortage conditions (Stage IV).

(e) Stages II, III, and IV costs reflect hiring the equivalent of four temporary staff and increased costs to administer and implement a customer communication effort.

(f) Cost savings for supply computed as the variable cost of CVP water (\$15.87/af) multiplied by the difference between the normal year sales and the shortage condition sales.

CCWD updates its Ten-Year Capital Improvement Program (CIP) annually based on historic and projected revenue and expenditures. The CIP provides a comprehensive view of the asset investments required over the next ten years to ensure adequate water resources, maintain high quality water, and meet the service needs of present and future customers. The CIP allows CCWD to prioritize its investments, manage cash flows, and project revenue requirements and long-term rate impacts to fund the proposed projects and anticipated operating costs. The revenue sources available to CCWD include water sales, system connection fees, interest income, property taxes, applicant funds, reserves, and other non-operating revenues including new funds from regional partnerships and various grants.

CCWD's annual CIP update provides the means to address the revenue impacts of reduced customer sales resulting from drought. Actions that may be taken in the CIP include use of reserves, reductions or deferrals in capital expenditures, and rate adjustments. There may be additional outside funding sources made available to water agencies under a water emergency situation (Stage IV).

Step Six. Draft Ordinance and Use Monitoring Procedure

10632 (h & i)

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

This section presents the actions required by CCWD to adopt the Emergency Water Reduction Plan. An Emergency Water Reduction Plan outline should be prepared and presented to the Board for their conceptual approval at least one month before it may need to be adopted. Staff requires time to prepare for special procedures and the customer service and billing personnel must make program modifications to the billing system. CCWD's Board of Directors must be kept well informed of the shortage status to enable them to make timely and appropriate decisions on the following actions:

1. Declaration of water shortage emergency
2. Adoption of Emergency Water Reduction Plan
3. Frequent assessment of water shortage status
4. Adoption of resolutions to change stage as necessary
5. Coordination with municipal and industrial customers on the development and implementation of the plan

A water shortage resolution (91-11) was adopted by the Board in response to the 1991 drought and is available from CCWD's Planning Department.

Mechanism to Determine Reductions in Water Use

Demands must be monitored frequently during emergency water shortages to enable CCWD to effectively manage the balance between supply and demand. This section presents suggested CCWD practices to adequately monitor the drought status.

Normal Monitoring Procedure

In normal water supply conditions, production figures are recorded daily. Totals are reported monthly to the Finance Department.

State I and II Water Shortages

During a Stage I or II water shortage, weekly production figures are forwarded to the Finance Department. This department compares the weekly production to the target weekly production to verify that the reduction goal is being met. Monthly reports are sent to CCWD's Board. If reduction goals are not met, the Finance Director will notify the Board so that corrective action can be taken.

Stage III and IV Water Shortages

During a Stage III or IV water shortage, the procedure listed above will be followed, with the addition of a daily production report to the Finance Director.

SECTION 5: Recycled Water Plan

Step One. Coordination

Step Two. Wastewater Quantity, Quality and Current Uses

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

- (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.*
- (b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.*
- (c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.*

CCWD coordinated the preparation of this section with the wastewater agencies that operate within its service area. Water recycling is a component of CCWD's long-term sustainable water supply strategy and CCWD cooperates with local wastewater agencies that wish to provide recycled water for appropriate purposes. CCWD completed a number of studies, demonstration projects, pilot testing programs and business plans between 1988 and 1993 to verify the feasibility of using recycled water. CCWD has entered into or amended the following agreements with Central Contra Costa Sanitary District (CCCSD) and Delta Diablo Sanitation District (DDSD) regarding specific projects that provide recycled water supplies for industrial uses and landscape irrigation:

- General Agreement for Recycled Water between CCWD and CCCSD, November 2, 1994 and amended in September 2004.
- Recycled Water for Landscape Irrigation (Zone 1) - Business Plan, April 1995 (prepared by CCCSD).
- Project Specific Agreement for Recycled Water Between CCWD and CCCSD, November 15, 1995.
- Agreement with DDSD for purveyorship of recycled water for the Delta Energy Center (DEC) and Los Medanos Energy Center (LMEC) power projects, April 2000.
- General Agreement for Recycled Water between CCWD and DDSD to provide recycled water to additional users who were not included in the April 2000 agreement, June 16, 2004.
- Maintenance Services Agreement between CCWD and CCCSD for recycled water facilities maintenance services, November 5, 2004.

The agreements allow for the development and operation of specific projects as well as the development of additional water recycling projects and consequent evaluation of potential alternatives to expand recycled water use.

Wastewater Collection and Treatment

The four wastewater treatment plants within CCWD's existing service area are the total potential sources of recycled water. A brief description is provided for each treatment plant, summarizing the existing treatment processes, current flows, and wastewater disposal methods. Figure 5-1 shows the wastewater districts that operate with CCWD's service area. Table 5-1 provides a summary of these wastewater treatment plants and lists their respective treatment levels, flows, and effluent disposal methods.

Central Contra Costa Sanitary District

CCCSD's wastewater treatment plant is located at the intersection of Interstate 680 and Highway 4. The treatment plant has a current dry weather permitted capacity of 53.8 mgd and currently treats an average of 43.4 mgd. Effluent from the activated sludge secondary treatment process is disinfected with ultraviolet (UV) light and then discharged into the Suisun Bay via a deep-water outfall. A portion of the UV disinfected secondary effluent is diverted to CCCSD's recycled water production plant for tertiary treatment using direct filtration followed by disinfection with sodium hypochlorite. CCCSD's recycled water conforms to Title 22 requirements for unrestricted use.

Mt. View Sanitary District

The Mt. View Sanitary District (MVSD) wastewater treatment plant is located near the Shell Oil Refinery on unincorporated land. MVSD serves approximately 25,000 people in the City of Martinez and in unincorporated areas. Treatment processes include secondary clarification, digestion, a biofilter, filtration, and UV disinfection. MVSD's wastewater treatment plant discharges treated effluent into wetlands at the plant site, which flow to Peyton Slough and then to the Carquinez Strait. The plant has a dry weather permitted capacity of 3.2 mgd and currently treats an average of 2 mgd.

Delta Diablo Sanitation District

The DDSDD water treatment plant is located on the Pittsburg-Antioch Highway at the border of the two cities. The treatment plant has a current dry weather permitted capacity of 16.5 mgd and currently treats an average of 13.4 mgd. Effluent from the trickling filter/activated sludge secondary treatment process is disinfected and discharged to New York Slough where it provides beneficial use by augmenting freshwater inflow into the Delta. The plant produces an oxidized wastewater and does not provide nitrification.

A 12.8 mgd recycled water plant was completed in 2001 and provides the DEC/LMEC power projects with up to 8,600 acre-feet/year of tertiary treated recycled water for cooling and process

water. The facility is the largest industrial recycled water project in the State of California. The General Agreement completed in 2004 will provide for an additional 1,650 acre-feet/year of recycled water to CCWD irrigation customers.

Ironhouse Sanitary District

Ironhouse Sanitary District (ISD) is located in the City of Oakley. ISD collects and treats wastewater from the City of Oakley, Bethel Island and areas outside of the City limits. The treatment process consists of two parallel, two-stage aerated ponds. Treated wastewater from the aerated pond system is used to irrigate agricultural lands on ISD's "mainland" property as well as on portions of Jersey Island. The ISD treatment plant produces a non-nitrified secondary effluent meeting a 23 MPN/100 ml coliform count. Much of the treated wastewater from the ISD treatment plant has been identified in the FWSS for use outside of CCWD's current service area.

The existing wastewater treatment plant capacity is 2.69 mgd with current flow to the plant at 2.3 mgd. ISD is in the process of completing an Environmental Impact Report to expand treatment and disposal capacity to 8.6 mgd.

TABLE 5-1. WASTEWATER COLLECTED & TREATED					
Wastewater Agency	Treatment Level (1,2,3)	Plant Capacity (AFY)	Average Flow (AFY)	Meets Recycled Water Standard (AFY)	Non Recycled Disposal to:
Ironhouse Sanitary District	1	3,000	2,600	2,600	
Delta Diablo Sanitation District	2 & 3 ^(a)	18,500	15,000	14,300	New York Slough
Central Contra Costa Sanitary District ^(b)	2 & 3	60,300 ^(c)	48,600	33,000	Suisun Bay
Mt. View Sanitary District	2	3,600 ^(d)	2,200		Peyton Slough; wetlands
TOTAL		85,400	68,400	49,900	

(a) Capability up to 12.8 mgd (14,300 AFY) exists for level 3 treatment but is not fully utilized.

(b) Sewage flows tributary to the CCCSD's wastewater treatment plant include CCWD's TWSA and a portion of EBMUD's service area.

(c) Based on dry weather permitted discharge capacity of 53.8 mgd.

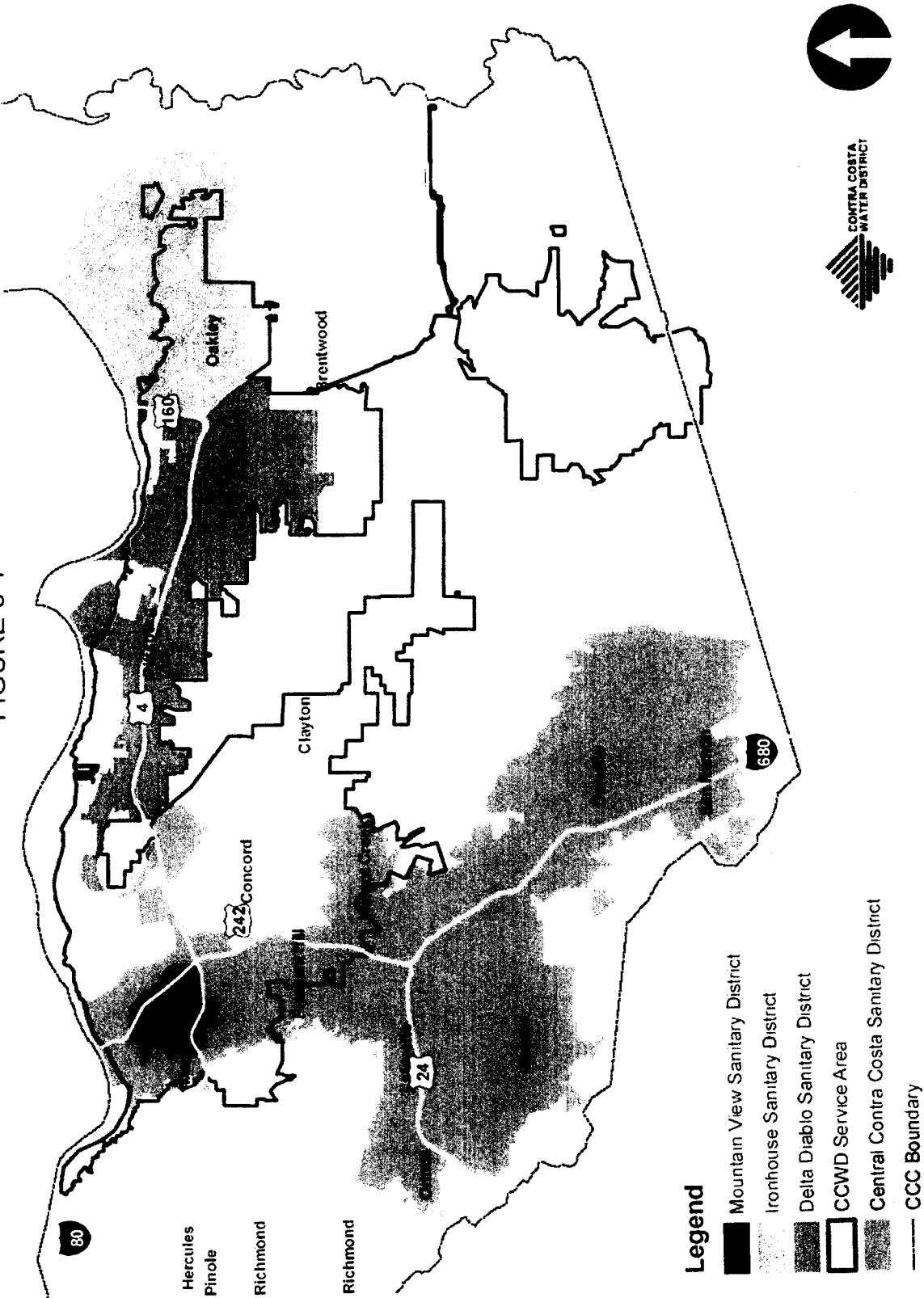
(d) Based on dry weather permitted discharge capacity of 3.2 mgd.

Recycled Water Currently Being Used

In 1974, MVSD constructed wetlands as a water reclamation project in response to the Clean Water Act. As the flows to the plant increased, the original acreage of wetlands increased from 20 to 86 acres. In 1994, another 100 acres of wetlands were added as a result of a joint management agreement. The plant currently treats an average of 1.8 million gallons of wastewater per day.

WASTEWATER AGENCIES WITHIN CCWD SERVICE AREA

FIGURE 5-1



In 1996, CCCSD and CCWD reached an agreement allowing CCCSD to purvey recycled water to areas of Concord and Pleasant Hill. Sixty-one customers were identified in the agreement as potential recycled water users. CCCSD purveys about 200 million gallons per year of recycled water for landscape irrigation to 24 of these CCWD customers which include golf courses, school ball fields, parks and medians, a concrete recycling and batch plant, a woodchip and topsoil farm, and the Contra Costa County Animal Shelter where recycled water is used outside for both landscape irrigation and inside the buildings for kennel washdown. The animal shelter is the first dual plumbed facility in the CCWD service area. CCCSD also uses almost 400 million gallons per year of recycled water internally at its own facilities for process water at its wastewater treatment plant and for landscape irrigation. Average day demand for recycled water is about 1.5 mgd with build out to reach 2.8 mgd. In 2004, CCCSD and CCWD established a maintenance services agreement under which CCWD provides maintenance and repair services for CCCSD's recycled water pipeline distribution system.

In 2000, DDSO and CCWD reached an agreement for DDSO to purvey recycled water to the Delta Energy Center and the Los Medanos Energy Center (DEC/LMEC). Tertiary-treated wastewater from DDSO is used for turbine cooling and make-up in cooling towers at the energy facilities. Additional treatment of the water to comply with the requirements of the Department of Health Services is done onsite with a new 13 mgd reclamation plant. CCWD provides the power projects with up to a 10 mgd backup supply. Average day demand for recycled water is approximately 6.3 mgd. Water for steam production and domestic uses is supplied by CCWD. The recycled water facilities were operational by June 2001, and the energy centers were operational by 2002. DDSO also provides recycled water to a number of irrigation customers as part of the agreement. The total demand for these irrigation customers is approximately 80 acre-feet annually.

In 2004, DDSO and CCWD reached a General Agreement allowing DDSO to provide recycled water to additional users who were not included in the April 2000 agreement. Recycled water distribution facilities will be planned to serve urban landscape and golf course irrigation projects in the Pittsburg and Antioch areas. The City of Pittsburg completed a facilities plan in January 2005, which focused on developing additional recycled water facilities to provide irrigation supply for municipal parks and the Delta View Golf Course. DDSO and the City of Antioch are currently working on a recycled water master plan to identify landscape and golf course irrigation projects in the Antioch area. The master plan will also look at the potential for dual plumbing and irrigation in proposed new developments that include a golf course, commercial, business and senior housing projects.

Step Three. Potential and Projected Use, Optimization Plan with Incentives

10633 (d-g)

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

Potential Uses of Recycled Water

Potential recycled water opportunities identified in the FWSS for CCWD include urban landscape irrigation projects, industrial reuse projects, agricultural irrigation projects, and groundwater recharge recycling projects. Most projects would require construction of water treatment and distribution facilities. Following are brief discussions of the potential alternatives. Note that because the wastewater in this area is discharged to Suisun Bay or the Delta, no increase in Delta water yield arises from recycling in this area.

Urban Landscape Irrigation Projects - These projects could supply recycled water for landscape irrigation. Potential irrigation sites include parks, schools, golf courses, median strips, business parks, and homeowner's associations. Potential projects could be located in Central Contra Costa County, Pittsburg/Antioch, and East Contra Costa County. The Pittsburg project has received a state funded (\$0.88 million) grant for the development of its project. A Master Plan is currently being developed that will identify landscape and golf course irrigation projects in the City of Antioch.

Industrial Reuse Projects - These projects could supply highly treated recycled wastewater to selected industrial customers for process and cooling purposes. Industries typically demand very high quality water, requiring tertiary and sometimes demineralized treatment. Potential customers include the Tesoro and Shell oil refineries.

TABLE 5-2. POTENTIAL USES OF RECYCLED WATER

Recycling Alternative	Recycled Water (af/yr) ^(a)
Urban Irrigation	
CCCSD - Central County Urban Irrigation	9,000 ^(b)
DDSD - Pittsburg/Antioch Urban Irrigation	8,200 ^(c)
ISD - East County Urban Irrigation	400 ^(d)
Industrial Use	
Oil Refinery Process Use	26,900 ^(b)

(a) Maximum estimated amount of recycled water that could reasonably be developed.

(b) Estimate based on CCCSD's remaining proposed projects as listed in the Bay Area Water Quality and Supply Reliability Program after implementation of General Agreement recycled water projects.

(c) Estimated based on DDSD's remaining secondary effluent after the DEC/LMEC and implementation of General Agreement recycled water projects.

(d) ISD's potential use of recycled water calculated as plant capacity (3,000 af/yr) less current average annual use (2,600 af/yr). ISD is in the process of completing an Environmental Impact Report to expand treatment and disposal capacity to 8.6 mgd (9,600 af/yr).

TABLE 5-3. ACTUAL AND PROJECTED FUTURE USE OF RECYCLED WATER

Recycled Use	2000 projection for 2005 (af/yr)	2005 actual (af/yr)	2010 (af/yr)	2015 (af/yr)	2020 (af/yr)	2025 (af/yr)	2030 (af/yr)
Landscape	1,710 ^(a)	700	Up to 3,360 ^(a)	3,360 ^(a)	3,360 ^(a)	3,360 ^(a)	3,360 ^(a)
Industrial ^(b)	Up to 12,300	7,920	Up to 9,720	Up to 9,720	Up to 9,720	Up to 9,720	Up to 9,720
Total	Up to 14,000	8,620	Up to 13,080	Up to 13,080	Up to 13,080	Up to 13,080	Up to 13,080

(a) CCCSD's Pleasant Hill Project (1,630 af), DDSD's LMEC/DEC project (80 af) and DDSD/CCWD General Agreement (1,650 af).

(b) DDSD's 12.8 mgd water recycling plant provides recycled water to the DEC/LMEC power projects. The power plants will use up to 8,600 af/yr. CCCSD's industrial use includes 1,120 af/yr of plant use.

Encouraging Recycled Water Use

Authority for the Recycled Water Program was established by the adoption of the Contra Costa Water District Strategic Plan by the Board of Directors in February 1989. In addressing issues regarding development of new markets, the Board adopted a policy statement to develop a market for recycled water in Central and East County. Subsequently, the Board adopted Resolution No. 90-79 declaring certain policies in regard to recycled water that included: "CCWD will implement recycled water projects which are financially viable, provide beneficial use and are consistent with appropriate legal, public health and environmental requirements."

On November 2, 1994 (amended September 2004), CCCSD and CCWD and on June 16, 2004, DDSD and CCWD executed general recycled water agreements whereby both districts can develop a joint project or, each district can develop its own individual project(s) by cooperating

with the other agency in planning, design, and construction activities. The agreements are intended to address and resolve legal issues, namely duplication of service, arising from the purveying of recycled water by a sanitation district in CCWD's service area.

Recycled Water Optimization Plan

CCWD is located within the statutory limits of the Sacramento-San Joaquin Delta, or immediately adjacent thereto and conveniently served with water therefrom. Drainage and wastewater from CCWD's service area is returned to the Delta or to Suisun Bay. Consequently, a large fraction, if not all of the wastewater from CCWD's service area is put to beneficial use (redirection by others or as an increment of Delta outflow). As such, recycling wastewater within CCWD, while improving water use efficiency, does not provide a one-to-one statewide benefit in water supply as would recycling water of Delta origin that would otherwise be discharged to the ocean or a salt sink.

CCWD's general agreements with both CCCSD and DDSO establish a process for developing future reclaimed water projects and project specific agreements for reclaimed water projects with CCCSD and DDSO, respectively. Due primarily to high initial costs and substantial lack of benefit in times of shortage, CCWD has not developed permanent recycled water projects. When evaluated over time and in the context of costs and benefits of other water supplies, these parameters may change. The FWSS provides the analysis necessary to determine when different types of reclaimed water projects may become viable alternatives. Potential recycled water projects identified in the FWSS will continue to be reexamined as a potential source when the FWSS is updated (approximately every five years), or as new technology becomes available.

The installation of dual distribution system piping during construction of new development is a means to minimize the costs of recycled water projects. On March 27, 1991, the Contra Costa County Board of Supervisors passed a "Dual Water Systems" Ordinance providing procedures for

"county cooperation with public water and wastewater agencies within the County's unincorporated area in the development of projects to incorporate dual water systems whenever feasible and consistent with applicable legal, public health, safety and environmental requirements."

SECTION 6: Water Quality Impacts on Reliability

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

The quality of water in the Delta, the District's sole source of water, continues to deteriorate despite efforts to improve it. Delta water quality problems are being compounded by increased water use and greater wastewater, storm water and agricultural discharges from statewide development and growth. A number of projects and programs are being developed, or are in place, to address Delta water quality degradation at the statewide level through CALFED, and through local and regional projects. In order to continue to provide high quality water for its customers and meet increasingly stringent drinking water quality standards, the District has initiated or is participating in a number of water quality improvement projects.

CCWD has initiated the Alternative Intake Project to relocate some of its pumping to a new drinking water intake in the Delta. Because water quality varies widely throughout the Delta, a new intake located further east will allow CCWD to divert water of higher quality during dry periods, including droughts. The intake will provide CCWD with the flexibility to divert higher quality water from the Delta without increasing the amount of water pumped. The Project is currently in the planning phase. CCWD is working in cooperation with the Bureau of Reclamation on an Environmental Impact Report/Environmental Impact Statement.

CCWD is also implementing the Canal Encasement Project which consists of lining or encasement of approximately four miles of the Contra Costa Canal from the Rock Slough Intake to Pumping Plant No. 1. The purpose of the project is to improve source water quality at the Rock Slough Intake by hydraulically isolating the high saline groundwater from the Canal. The project will also increase public safety, and flood control.

In January 2004, the CCWD and the East Bay Municipal Utility District (EBMUD) entered into an agreement to wheel water through the Freeport Regional Water Project facilities. The principal issue addressed was how to operate the proposed Freeport Regional Water Project so that water quality at CCWD's delta intakes would not be diminished. The Agreement details coordination of operations to lessen potential water quality impacts, addresses cost allocations, and provides a resolution to financial impacts.

In March 2004, the District's voters passed a measure to study the feasibility of expanding the Los Vaqueros Reservoir from 100,000 to 500,000 acre-feet. Enlarging the reservoir would improve water quality and water supply reliability for Bay Area water users while enhancing the Delta environment.

Also in early 2004, CCWD formed a regional partnership with local water agencies to begin a research project on advanced water treatment processes. The Advanced Treatment Demonstration Project involves full-scale application of new technologies as applied to source water from the Sacramento-San Joaquin Delta. The research examines methods to produce safer drinking water with new and existing disinfectants and advanced filtration.

Water quality impacts to the District's supply reliability have been considered in the development of projected supplies in Section 2.

SECTION 7: Water Service Reliability

Step One. Projected Normal Water Year Supply and Demand

Step Two. Projected Single-Dry-Year Supply and Demand Comparison

Step Three. Projected Multiple-Dry-Year Supply and Demand Comparison

10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Table 7-1 compares the available supply with projected demands to determine the conditions under which supply deficits are expected to occur over the next 25 years. The District does not anticipate any supply deficits in normal years due to the District's long-term conservation program and the use of purchases from ECCID under the current agreement.

Urban Water Management Plan

TABLE 7-1. PROJECTED SUPPLY AND DEMAND COMPARISON

Condition ^(a)	Total Planned Supply	Demand	Difference	Difference as % of Supply	Difference as % of Demand
	(af/yr)	(af/yr)	(af/yr)		
Near-Term					
Normal	210,100	143,750	none	-	-
Single-Year Drought	168,200	143,750	none	-	-
Multi-Year Drought (yr 1)	168,200	143,750	none	-	-
Multi-Year Drought (yr 2)	150,800	143,750	none	-	-
Multi-Year Drought (yr 3)	133,400	143,750	10,350	0.08	0.07
2010					
Normal	240,300	194,700	none	-	-
Single-Year Drought	195,300	194,700	none	-	-
Multi-Year Drought (yr 1)	195,300	194,700	none	-	-
Multi-Year Drought (yr 2)	184,800	194,700	9,900	0.05	0.05
Multi-Year Drought (yr 3)	165,400	194,700	29,300	0.18	0.15
2015					
Normal	244,200	203,400	none	-	-
Single-Year Drought	204,200	203,400	none	0.00	0.00
Multi-Year Drought (yr 1)	204,200	203,400	none	0.00	0.00
Multi-Year Drought (yr 2)	192,700	203,400	10,700	0.06	0.05
Multi-Year Drought (yr 3)	173,200	203,400	30,200	0.17	0.15
2020					
Normal	246,500	212,000	none	-	-
Single-Year Drought	212,500	212,000	none	0.00	0.00
Multi-Year Drought (yr 1)	212,500	212,000	none	0.00	0.00
Multi-Year Drought (yr 2)	200,000	212,000	12,000	0.06	0.06
Multi-Year Drought (yr 3)	180,500	212,000	31,500	0.17	0.15
2025					
Normal	249,100	217,200	none	-	-
Single-Year Drought	218,100	217,200	none	0.00	0.00
Multi-Year Drought (yr 1)	218,100	217,200	none	0.00	0.00
Multi-Year Drought (yr 2)	204,100	217,200	13,100	0.06	0.06
Multi-Year Drought (yr 3)	184,600	217,200	32,600	0.18	0.15
2030					
Normal	251,600	222,300	none	-	-
Single-Year Drought	222,600	222,300	none	0.00	0.00
Multi-Year Drought (yr 1)	222,600	222,300	none	0.00	0.00
Multi-Year Drought (yr 2)	208,600	222,300	13,700	0.07	0.06
Multi-Year Drought (yr 3)	189,100	222,300	33,200	0.18	0.15

SECTION 8: ADOPTION AND IMPLEMENTATION OF UWMP

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. (a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption.

Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also

prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CCWD provided copies of the draft UWMP to its municipal customers, and cities and counties within its service area during the month of November 2005. CCWD also conducted a public hearing on December 7, 2005 to encourage the involvement to community groups prior to completion of the UWMP.

The CCWD Board of Directors at its scheduled meeting on December 7, 2005 adopted the final UWMP. A signed copy of the resolution is provided in Appendix D. The final UWMP is to be submitted to the DWR and other agencies involved in the preparation of the Plan within 30 days following adoption and CCWD will make the Plan available for public review within 30 days of filing with DWR.

